

MARINE REVIEW.

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Season's Ore Shipments.

Reports from all upper lake shipping ports to the association of ore dealers are now near enough to actual figures to indicate the season's entire shipments. Without full reports for November, officers of the association placed the season's shipments at nine and a quarter millions, but the November movement has been a little in excess of the estimates, and it is now quite generally agreed that the total for the full season will be about 9,350,000 tons. As compared with the previous six years, the 1896 record of ore shipments is, therefore, as follows:

Season of	Gross tons.
1896 (estimated).....	9,350,000
1895	10,429,037
1894	7,748,223
1893	6,065,716
1892	9,072,241
1891	7,071,053
1890	9,003,725

It will thus be seen that, notwithstanding the depressed condition of the iron ore industry for six months past, which reduced the production of pig iron and steel to about half the capacity of the country and lowered prices to figures unthought of in the industry, the shipments of iron ore this season are exceeded only by the season of 1895, when the total was nearly ten and a half millions. It is evident now that a production of twelve million tons of ore, which was figured on last spring, would have made the season profitable to the vessel interests, notwithstanding the increase in the lake fleet and the great increase in capacity, due to greater draft in connecting channels. This is proven by the fact that the freight movement on the lakes as a whole during 1896 has been largely in excess of all previous years. The grain movement has been double what it was in 1895. From Lake Superior the figures on grain of all kinds moved eastward are 73,081,593 bushels to Nov. 1, 1896, against only 29,589,325 bushels on the same date in 1895.

But the shrinkage in spring estimates of ore shipments, due mainly to political disturbance, can not now be made up, and there is little prospect of profit in freights for the remaining few weeks of the season. Ore shipments are practically at an end and advanced prices in grain have cut off the export demand for the present.

Readers of the Review remember the failure of the Merritts of Duluth in their attempt to develop iron mining properties and a railway on the Mesabi iron range. They will also remember the consolidation of a large number of iron mines brought about by representatives of Mr. John D. Rockefeller, who had loaned money to the Merritts and others in their enterprise and who was afterward compelled to take up and complete the railway and develop the mines. Following these transactions, Alfred Merritt sued Mr. Rockefeller claiming damages on account of alleged fraudulent misrepresentations. He obtained a verdict in the United States district court for \$940,000. The verdict was a big surprise, and the case was, of course, carried to a higher court. Now it is announced from St. Paul that the United States circuit court of appeals has ordered the case back to the lower court for a new trial.

A cargo of grain aggregating 5,328 net tons has just been delivered at Buffalo from Duluth by the steamer Queen City, and that boat again holds the Lake Superior cargo record. The largest Lake Superior cargo previous to this one was carried by the Bessemer company's steamer Sir William Siemens, and consisted of 174,500 bushels, equal to 5,235 net tons. The Queen City's cargo of 5,328 net tons consisted of 66,283 bushels of oats, 50,360 bushels of corn and 95,326 bushels of wheat. The steamer Yale has just taken out of West Superior, on 15 feet 9 inches draft, a cargo of 43,000 barrels of flour, the largest load of its kind ever moved from Lake Superior.

Negotiations for New Ships.

Just before going to press, it is learned that Robert R. Rhodes of Cleveland, who is now in Chicago with James Wallace of the Cleveland Ship Building Co., has closed a contract with the Chicago Ship Building Co. for two steamers of Welland canal size, about 252 feet keel, that will cost between \$100,000 and \$125,000 each. Boilers and engines will be built by the Cleveland Ship Building Co. The boats will be suited to handling package freight.

Builders of steel ships are all asking for options on material and auxiliary machinery, which would indicate some figuring for new vessels. It is announced definitely that the Minnesota Iron Co., represented by Pickands, Mather & Co., of Cleveland, will build a large steel tow barge, and they are also considering the advisability of adding 48 feet to the length of one of the original small steamers of the line. If these steamers were increased 48 feet in length, they would be brought into the class of vessels that carry about 3,000 gross tons on 15½ feet draft. The expense in each case would, however, be about \$40,000 for a gain of about 500 gross tons capacity, so that the matter of alterations will very probably be given careful consideration before it is undertaken in all of the boats.

Rumors of contracts for two new steel freight vessels at Wheeler & Co.'s yard, West Bay City, are referred to in the newspapers of that place, and it is also said that Mr. Wheeler expects to build another big steel car ferry for the F. & P. M. Ry. Co., but there is nothing definite about these reports. Capt. James Davidson is said to be preparing to put down, next week, the keel for a large wooden tow barge that will be practically a duplicate of several boats of this kind which he has built during the past year.

At Buffalo plans have been made by the Union Dry Dock Co. for alterations in the Union line steamers Owego and Chemung, with a view to additional capacity and economy in operating expenses. Further than this nothing is said, as the alterations are under advisement and not decided, but it is well known, of course, that these boats, which are the flyers of the lakes, are not economical freighters.

The American Steel Barge Co. has begun, at West Superior, the work of lengthening the two small barges brought up from the Atlantic coast. They will be hauled out of the water for this purpose, and it will not, therefore, be necessary to give up the use of the company's big dock for the work.

The United States light-house board, Washington, D. C., will in a few days call for proposals on three light-ships and two light-house tenders. It is understood that none of these vessels are for the lakes but all of them will probably be of a size that will permit of their passage through the St. Lawrence canals to the Atlantic.

No other iron range so far discovered possesses greater apparent reserves than the Mesabi of Minnesota. Conservative estimates formulated from the records of properties now exploited and worked, together with others determined by systematic explorations and analyses, show that the Mesabi range can supply ore (which will equal in average iron and phosphorus contents) double the quantity which the entire Lake Superior region has produced in fifty years. This means 200,000,000 gross tons. In this estimate there are not included a number of properties which have been imperfectly explored.—John Birkinbine, mining expert.

County officials at Ashtabula are still fighting the order of the war department with reference to the county swing bridge at Ashtabula Harbor. The war department has declared the bridge an obstruction to navigation and is demanding a reconstruction of it that will involve heavy expense. Col. Jared A. Smith, government engineer in charge of the district, has been joined by Col. John W. Willson, another member of the army engineer corps, and the two officers will make another investigation, jointly, before final action is taken by the department.



SUPPLEMENT TO THE MARINE REVIEW, (ILLUSTRATED). CLEVELAND, O., VOL. 14, NO. 18, OCT. 29, 1896.

PANORAMIC VIEW OF BOIS BLANC ISLAND, THE LIME-KILNS AND AMHERSTBURG.

(Reproduced from a photograph, 11 by 28 inches, being one of sixty views made especially for the MARINE REVIEW.)

Auxiliary Cruisers.

It has been known for some time past that the navy department has on file in Washington plans of different types of merchant steam vessels, owned in various parts of the country, which would be useful, if required, as auxiliary cruisers. Many of these vessels are owned on the lakes. Within the past few months the bureau of construction and repair, navy department, has prepared plans for converting some of them into auxiliary cruisers, and it was thought the department would urgently recommend the purchase of equipment that could be kept in store ready for immediate use. The chief constructor does not, however, make a very strong appeal in this regard. His report contains only the following paragraph on the subject:

"During the past winter the bureau prepared plans for converting several classes of ships, which are entered in the naval reserve list, including the Owego class and the Hudson class of lake vessels, and the El Sol class and the El Dorado class of ocean-going vessels, into effective auxiliary cruisers. Such plans should be prepared and kept on file in a special department for ready reference, covering all vessels available for use as auxiliary cruisers, so that in case of emergency orders could be given to take the vessels in hand and convert them with no unnecessary delay. At present, however, such work can be done only when there are no designs for new vessels in hand, and as opportunity offers to spare the services of draftsmen for the purpose. As far as possible such articles of outfit as are not perishable and material for conversion of each of these vessels should be prepared and kept in store ready for immediate use."

New York State Canal Improvement Contracts.

The following contracts under the \$9,000,000 canal improvement appropriation were awarded at Albany, Friday, by Superintendent Aldridge of the New York state department of public works:

For improving the Erie canal from lock 20 to 21 to J. W. Whalen of Whitehall, N. Y., at \$52,910.

For improving Erie canal from lock 27 to 28 to Lauer & Hagaman of Rochester, N. Y., at \$74,159.

For improving Erie canal from lock 28 to 29 to Galle & McNiece of New York City at \$31,590.

For improving Erie canal from lock 32 to 33 to Brumelkamp & Lane Co. of Syracuse, N. Y., at \$88,434.

For improving Erie canal from lock 33 to 34 to Lauer & Hagaman of Rochester, N. Y., at \$43,831.

For improving Erie canal from lock 42 to lock 44 to John V. Quackenbush of Mohawk, N. Y., at \$113,436.

For improving Champlain canal from water for side cut to lock 5 to Whalen & Higgins of Waverly, N. Y., at \$58,376.

For improving Champlain canal between lock 6 and lock 7 to J. W. Whalen of Whitehall, N. Y., at \$92,296.

For improving Champlain canal between lock 15 and lock 16 to Mahan & Sundstrone of Sandy Hill, N. Y., at \$214,312.

For improving Erie canal from lock 32 to bridge No. 55 to Shear & Haight of Schenectady, N. Y., at \$79,320.

For improving Erie canal from lock 44 to lock 45 to John B. Quackenbush of Mohawk, N. Y., at \$38,749.

His Eyesight Was Also Good.

In the United States navy the well-known saying that "cleanliness is next to godliness," is accepted in all its literal meaning, and no minor offense is more condemned or more severely punished than that of being unclean in dress or allowing dirt to accumulate in any part of the ship. Every morning at "quarters" the clothes worn by the men are carefully inspected by the officers of the different divisions, and the boys are subjected to a preliminary scrutiny by the master-at-arms, who is chief of police of the vessel. On each Sunday morning the captain and first lieutenant make a complete round of the ship while the crew are mustered on the upper deck. Woe betide the unfortunate man or boy who is "black-listed" for uncleanness.

A very amusing story is told in the service, which concerns a line officer and an apprentice boy on board the same ship. One day while the lieutenant was patrolling the bridge, a group of boys were clustered about one of the guns beneath him. Suddenly the officer halted, hung over the railing as though to obtain a closer view of the lads, then called down:

"Taylor, go to the mast. Messenger boy, tell the master-at-arms to report to me."

After his orders had been obeyed, the lieutenant stated that he had seen vermin crawling on the white collar of the apprentice's canvas working suit, and ordered that the lad's name was to be given to the ship's writer, who would "list" it together with the offense charged, and submit the same to the executive officer for his consideration and award of punishment. This was done, and Taylor was obliged to carefully scrub his clothes and to stand extra watch for several nights in succession as a penalty. Now on board of men o' war one of the crew is stationed aloft during the day as a lookout, and it happened shortly after the above incident that Taylor was on the fore-topsail yard performing this duty while the lieutenant who had reported him was in charge of the deck. The ship was on her way to Europe, and at the time in question was in about the middle of the Atlantic ocean. The boy hailed the deck.

"Sail 'o!"

"Where away?" called the officer.

"Right ahead, Sir," was the reply.

"Can you make her out?"

"Yes, Sir, a full rigged ship."

"How far off?"

"About three days sail, Sir."

"Lay down on deck at once," shouted the exasperated officer, "and go to the mast."

The lieutenant then sent for the executive officer and reported the lad's disrespect and skylarking while on duty.

"Taylor," said the first lieutenant severely, "what do you mean by making such a statement?"

"Please, Sir," blubbered the boy, "if—if the lieutenant can see a bug on my collar twenty feet away, I—I can see—see a full rigged ship three days sail ahead."—New York Nautical College Quarterly.

Cargo and Speed Records—Lake Freight Steamers.

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 5,088 gross or 5,699 net tons, Gladstone to Ashtabula, draft of 16 feet 10 inches. From Lake Superior—Steamer Sir Henry Bessemer, Bessemer Steamship Co. of Cleveland, 4,637 gross or 5,194 net tons, Ashland to Conneaut, draft of 15 feet 9 inches.

Grain—Steamer Queen City, A. B. Wolvin of Duluth, 207,000, bushels of corn, equal to 6,210 net tons, Chicago to Buffalo, 16 feet 8 inches draft; steamer Maricopa, Minnesota Steamship Co., Cleveland, 191,700 bushels of corn, Chicago to Buffalo; steamer Zenith City, A. B. Wolvin of Duluth, 289,000 bushels of oats, Chicago to Buffalo. From Lake Superior—Steamer Sir William Siemens, Bessemer Steamship Co. of Cleveland, 174,500 bushels of wheat, equal to 5,235 net tons, Duluth to Buffalo, draft of 15 feet 9 inches.

Coal—S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 54 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 65 hours and 10 minutes, 15.3 miles an hour.

German naval authorities have decided to equip all the present large men-of-war in the German navy with apparatus for heating their boilers partly with oil, and the use of liquid fuel will, it is said, be provided for in all new vessels. The oil will be stored on board in special tanks, from which it will be conducted to the furnaces by pipes, and ejected in a spray by steam. For the storage of the liquid fuel in large quantities, reservoirs holding over 100,000 gallons have been built at Wilhelmshaven, and similar arrangements are to be made at Kiel and Dantzie.

California is convenient. Comfort, speed and economy in rates are the distinguishing characteristics of the fast western express leaving Cleveland daily at 10:58 a. m. via the Nickel Plate road, and reaching Chicago at 9:00 p. m. same day, and our night express arriving at Chicago at 7:40 a. m. daily. Direct connections at Chicago with all the leading lines for Los Angeles, San Diego, and San Francisco. Through tickets and baggage checks. Sleeping car space and all details arranged by any agent of the Nickel Plate road. Cleveland city ticket office, 224 Bank street.

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Army and navy charts of the lakes are kept in stock by the Marine Review, Perry-Payne building.

Canal Records will Again be Broken.

It is still more than probable that the volume of commerce to and from Lake Superior during 1896 will be fully a million tons greater than it was in 1895. The closing months of last season were the most active months of the season, and it is not surprising that the combined freight traffic of the two canals for October, 1896, shows a decrease of about 44,000 tons as compared with October, 1895, but still there is an increase for the season to Nov. 1 of more than 1,500,000 tons, and it is not probable that this will be reduced very much in the four or five weeks of the navigation season that remains. As noted several times, when the canal figures have been under discussion, the great gain is in grain shipments. Grain shipments eastward to Nov. 1 of this year foot up 73,081,593 bushels, against 29,589,325 bushels on the same date a year ago, or a gain of 43,492,268 bushels, which is equal to more than a million tons. Soft coal shipments to Nov. 1 of this year are about 300,000 tons in excess of the movement on the same date in any previous year. Hard coal shipments are about equal to the shipments of the past three years. Summaries prepared from combined statements received monthly from the two canals are printed herewith:

MOVEMENT OF PRINCIPAL ITEMS OF FREIGHT TO AND FROM LAKE SUPERIOR.

ITEMS.	To Nov. 1, 1896.	To Nov. 1, 1895.	To Nov. 1, 1894.	To Nov. 1, 1893.
Coal, anthracite, net tons.....	349,929	354,414	429,016	2,704,636*
Coal, bituminous, net tons ..	2,315,437	1,859,818	2,039,046	
Iron ore, net tons	7,459,264	7,543,207	6,111,148	3,729,506
Wheat, bushels.....	52,107,888	28,900,614	26,502,088	37,086,789
Flour, barrels.....	6,841,632	7,236,732	7,236,351	5,995,667

The total movement of all kinds of freight, shown below, to and from Lake Superior to Nov. 1, 1896, is 14,539,968 tons. This is over a million and a half tons greater than to Nov. 1, 1895, full three million tons greater than on the same date in 1894, and nearly five million tons greater than on the same date in 1893.

REPORT OF FREIGHT AND PASSENGER TRAFFIC TO AND FROM LAKE SUPERIOR, FROM OPENING OF NAVIGATION TO NOVEMBER 1 OF EACH YEAR FOR FOUR YEARS PAST.

EAST BOUND.

ITEMS.	Designation	To Nov. 1, 1896.	To Nov. 1, 1895.	To Nov. 1, 1894.	To Nov. 1, 1893.
Copper	Net tons...	106,038	94,251	85,919	75,531
Grain, other than wheat	Bushels....	20,973,705	688,711	1,530,008	2,270,969
Building stone.....	Net tons...	17,194	22,835	20,295	17,999
Flour.....	Barrels....	6,841,345	7,234,582	7,235,568	5,991,807
Iron ore.....	Net tons...	7,459,264	7,543,207	6,111,148	3,729,506
Iron, pig.....	Net tons...	21,631	20,861	19,663	28,679
Lumber.....	M. ft. b.m.	631,982	695,875	648,643	511,686
Silver ore.....	Net tons...	240	100	412	2,430
Wheat.....	Bushels....	52,107,888	28,900,614	26,502,088	37,086,789
Unclassified freight.	Net tons...	157,357	129,704	134,021	121,696
Passengers	Number...	18,197	16,250	13,397	8,787

WEST BOUND.

Coal, anthracite.....	Net tons..	349,929	354,414	429,016	2,704,636*
Coal, bituminous.....	Net tons..	2,315,437	1,859,818	2,039,046	
Flour.....	Barrels....	287	2,150	783	3,860
Grain.....	Bushels....	2,209	35,650	10,500	26,544
Manufactured iron..	Net tons..	79,850	64,559	28,797	54,977
Salt.....	Barrels....	205,636	218,908	174,174	180,205
Unclassified freight.	Net tons..	285,464	264,631	225,115	225,788
Passengers.....	Number..	18,503	16,818	13,216	9,509

*Previous to 1894 anthracite and bituminous coal were not reported separately.

SUMMARY OF TOTAL FREIGHT MOVEMENT IN TONS.

	To Nov. 1, 1896.	To Nov. 1, 1895.	To Nov. 1, 1894.	To Nov. 1, 1893.
West bound freight of all kinds, net tons.....	3,067,519	2,527,768	2,648,920	3,043,028
East bound freight of all kinds, net tons	11,472,449	10,471,311	8,600,066	6,614,735
	14,539,968	12,999,079	11,248,986	9,657,763

The total number of vessel passages to Nov. 1, 1896, was 17,053 and the registered tonnage 15,787,927.

A photograph of the largest boat on the lakes, the Sir Henry Bessemer, will cost you only \$1.50. Write the Marine Review.

Orr-Smith Collision Case.

A commissioner's report in the Orr-Smith collision case, which was heard by Judge Seaman in the United States district court at Milwaukee, provides that the owners of the steamer Arthur H. Orr are to pay to the Leathem & Smith Towing & Wrecking Co., owners of the steamer T. H. Smith, the sum of \$10,000 damages with interest from Nov. 11, 1896. The commissioner's report has been sustained by the court. Owners of the Orr will also have to stand half the expenses of the suit, which are quite heavy.

This is another collision case in which damages were divided. The Orr collided with the Smith early on the morning of Nov. 11, 1893, off Racine. The Smith was light and bound from Chicago to Menominee, and the Orr was running light to Chicago from Milwaukee. A dense fog prevailed at the time and the Smith was not discovered until within 300 feet of the Orr. The engines of the latter steamer were quickly reversed but the collision was unavoidable and the Orr crashed into the Smith with such force as to explode the boilers. It was claimed that the Smith did not sink immediately, but floated for several hours, when it would have been possible for the Orr to tow her into shallow water. This, it is claimed, was not done by the captain of the Orr for fear of grounding on Racine reef. Judge Seaman referred the matter to Commissioner Kurtz to determine the value of the sunken craft, which he fixed at \$20,000. This was excepted to, but Judge Seaman in his decision stated that it was a just valuation and damages would be allowed at half the sum, with interest, and with one-half the costs.

Tonnage of Rockefeller Fleet.

A table printed herewith shows that the aggregate net tonnage of sixteen vessels of the Bessemer Steamship Co. is 42,469. This is not carrying capacity. It is the tonnage computed by the treasury department from fixed rules of measurement. The carrying capacity of these vessels in net tons on 16 feet draft would be double the amount named.

Steamers.	Net tonnage.	Tow barges.	Net tonnage.
James B. Neilson.....	1,572	John Scott Russell.....	1,133
Henry Cort.....	1,572	Sir Joseph Whitworth..	1,133
Sir Henry Bessemer....	3,293	Alexander Holley.....	2,553
Sir William Siemens...3,293		George H. Corliss.....	3,124
John Ericsson.....	2,378	James Nasmyth.....	3,162
Sir William Fairbairn..3,181		Alfred Krupp.....	3,124
George Stephenson....3,503		Sir Isaac Lothian Bell..3,162	
James Watt.....	3,105		
Robert Fulton.....	3,181		
		Total	42,469

Capacity and Value of Ore Shipping Docks.

There are now on Lake Superior and Lake Michigan twenty-three ore shipping docks having a total of 4,624 pockets with an aggregate capacity of 633,804 gross tons, which have cost \$6,849,529. These docks are located as follows:

Two Harbors—Five docks, 729 pockets of 109,150 gross tons capacity; cost of construction, \$1,650,000.

Duluth—Two docks, 576 pockets of 92,160 tons capacity, \$860,021.

Superior—One dock, 250 pockets of 37,500 tons capacity, \$413,619.

Ashland—Three docks, 782 pockets, 101,776 tons capacity, \$942,576.

Marquette including St. Ignace and L'Anse—Six docks, 1,083 pockets of 125,000 tons capacity, \$1,733,304.

Escanaba—Five docks, 1,084 pockets of 151,218 tons capacity, \$1,122,000.

Gladstone—One dock, 120 pockets, 17,000 tons capacity, \$128,009.

A circular from President E. B. Thomas of the Erie Railroad Co. announces that Mr. Charles Paine, assistant general manager of the Union Steamboat Line, has been appointed general manager with office at Buffalo, vice Mr. Washington Bullard, deceased. The office of assistant general manager has been abolished.

Mr. H. F. J. Porter, M. E., of Chicago, western representative of the Bethlehem Iron Co., has prepared in pamphlet form his paper on "Hollow Forged Steel Shafts," as manufactured by the Bethlehem Iron Co., South Bethlehem, Pa.

In a large number of cases the Blue Book of American Shipping has been sent on approval to ship owners, ship builders, marine engineers and others interested in shipping. In every case the price of the book, which is \$5.00, has been remitted immediately.

American Fire Boats.

The most elaborate collection of information regarding fire boats that has ever been put together in this country is contained in a paper presented by H. DeB Parsons, consulting engineer of 22 William street, New York, at the fourth general meeting of the Society of Naval Architects and Marine Engineers, which closes in New York to-day. A feature of special value in the paper is a table giving particulars of twenty-four American fire boats. The table contains exhaustive details regarding hulls, main engines, boilers and pumping machinery of all of the boats. It is unfortunate that on account of its great size, only an abstract of it can be presented herewith. Mr. Parsons says:

"Fire boats are of such great importance to all marine cities, that they are properly regarded as a permanent and indispensable feature of their fire equipments. Experience has proved that although the requirements may not be exactly alike, many features of the service are common to all cities. There is little or no actual benefit to be derived from boats exceeding a certain size. Large boats become unhandy and slow in maneuvering, both of which requisites are of the greatest im-

AMERICAN FIRE BOATS.

Name.	Owner.	Material.	Dimensions. Length over all, beam and draft of water in feet.	Capacity. Gallons per minute
W. F. Havemeyer...	New York...	Wood.	106 -22 -10	2,870
W. S. Stokley.....	Philadelphia..	Steel.	96 -17 - 9	
S. G. King.....	Philadelphia..	Steel.	80 -18 - 7	1,200
Zophar Mills.....	New York....	Steel.	125 -25 - 9½	2,400
Chicago.....	Chicago.....	Wood.	90 -18 - 8½	2,260
Visitor.....	Philadelphia..	Steel.	75 -15 - 7½	425
Seth Low.....	Brooklyn....	Wood.	99 -23 - 7½	3,360
Geyser.....	Chicago.....	Wood.	109 -24 - 9	3,810
G. R. Potter.....	Buffalo.....	Steel.	80 -20 - 7	3,810
Yosemite.....	Chicago.....	Wood.	109 -24 -11½	5,010
Number 31.....	Boston.....	Wood.	108 -24 - 9	4,240
Cataract.....	Milwaukee...	Wood.	106½-24½- 9½	4,660
New Yorker.....	New York....	Steel.	125½-26 -11½	11,530
Snoqualmie.....	Seattle.....	Wood.	90 -22½-10	5,765
Cataract.....	Baltimore....	Wood.	85 -18½- 9	4,240
Fire Queen.....	Chicago.....	Wood.	90 -16 - 3½	2,260
J. M. Hutchinson..	Buffalo.....	Steel.	80 -20 - 7	4,445
D. A. Boody.....	Brooklyn....	Wood.	105 -23 - 8	5,765
E. S. Stewart.....	Philadelphia..	Steel.	110 -23½- 9½	5,765
Detroit.....	Detroit.....	Wood.	115 -25 - 9	5,010
James Foley.....	Milwaukee...	Wood.	107 -24 - 8½	5,010
J. H. Farley.....	Cleveland....	Steel.	90 -22 - 7½	3,360
Cleveland.....	Cleveland....	Wood.	82 -21 - 8	5,010
Number 44.....	Boston.....	Wood.	110 -26 - 8½	5,765

portance in successfully fighting a fire. When the length exceeds about 125 feet, such a condition appears to be reached. Possibly the best length for rapid maneuvering around docks and slips, in connection with the displacement required for a full equipment of fire apparatus, is between 100 and 125 feet. Twin screws are used in a few boats, but their actual advantage seems to be limited. While their maneuvering ability is undoubtedly increased, the extra floor space, weight, and difficulty of management of the double machinery offset all the advantages gained. Of twenty-eight self-propelling fire boats of American and European design, of which the author has records, only two are provided with twin screws.

"For the same reasons it further appears that speed exceeding fourteen statute miles per hour is also a sacrifice in general efficiency. Exceptions may, however, be taken for boats in certain localities, which have long distances to protect. In many such localities, it would be better to have two smaller boats. There is some division of opinion as to the advantage of providing permanent sleeping and living quarters for the men on board. There are some cities so situated as to make this a necessary feature. The author's experience, however, points to the general conclusion that only sufficient space should be appropriated for lockers for the men's clothes and enough bunks to accommodate the actual crew, but with cabin room to make all comfortable. The fire crew proper are then quartered near the station, and quickly notified by some electric call. Probably the most complete station in the world is that of engine company No. 57 of New York (fire boat New Yorker). The boat lies moored to the wharf and alongside of a suitable building in which the crew is quartered. The

house has a tower in which the wet hose can be hung for draining and drying, a feature especially valuable during the winter months.

"In the accompanying table will be found general information regarding twenty-four American boats. These boats which are expected to encounter heavy ice in winter are nearly all made of wood, although the Buffalo boats are notable exceptions. Some of them have forced passages through blue ice 12 inches in thickness, without damage to hull or machinery. The block coefficients of displacements vary between 42 and 50. Only one of these vessels, the New Yorker, is driven by a triple expansion engine, while six are equipped with compounds, and seventeen with simple expansion engines. In the matter of boilers, the fire tubular forms appear to have been preferred in the past, although five are furnished with water tubular types. The vertical, simple, duplex, crank and fly-wheel types of pumps are more generally in use than any other kind, although one of the Boston boats, known as No. 44, has compound pumps of the same class. The capacities given are calculated as being equal to the piston displacement at the speed usual for actual fire service, less 3 per cent. allowance for slip. These capacities can be increased by reducing the water pressure with consequent greater piston speeds. The maximum discharge capacities are probably 20 per cent. larger than stated. The New Yorker has nearly twice the capacity of the next largest boat. This vessel has an equipment of four vertical duplex pumps, which can be used together or separately. Since the boat has been in commission, on only a few occasions have all the pumps been used together, and very seldom has it been found necessary to operate more than two. It would appear that the general service efficiency of a fire boat is best attained by reducing the equipment as illustrated in this latter vessel, thus making a smaller and more easily handled boat. While there may be some advantage in case of accident in the duplication of parts, experience does not seem to warrant their being quadrupled, especially as accidents to the pumping apparatus so rarely occur. In brief, occasions requiring such a large pumping capacity so seldom happen, that in general it would be better to have two boats, each of one-half the capacity. The first cost of the two boats, having pumping capacity of 6,000 gallons each, would no doubt be greater than that for one boat of 12,000 gallons capacity, but the owner would gain in general fire efficiency sufficient to warrant the difference. However, circumstances may exist such as to demand the larger boat, so that the conditions of each case must be studied for a satisfactory solution of the problem of proper capacity. Nearly all the boats are designed for a water pressure of 300 pounds per square inch. Such high pressures are seldom used in service. Under ordinary conditions pressures are maintained from 100 pounds to 200 pounds per square inch.

"On account of the great loss due to the friction of the water when passed through long lengths of hose, there is a limit to the distance from the river-front at which a fire boat ceases to be of value. Some cities have, therefore, considered the expedient of providing underground water mains of large diameter to which the fire boats may connect. The city of Detroit has in operation such a system, which has been demonstrated to be of great practical value. There are in Detroit thirteen underground pipe lines, each about 4,800 feet in length, which extend back from the river into the business portion of the city. They are constructed of 8-inch steel pipe, and are located one block apart. Special hydrants are connected to these mains and so placed as not to be over 300 feet distant from each other.

"These hydrants have three 3-inch openings, and each outlet has its own controlling valve. A telephone is placed in connection with each hydrant so that the commander at the fire may have direct communication with the boat. The fire boat Detroit has served simultaneously six 3-inch streams from two hydrants and three lines of 3½ inch hose led directly from the boat. At this particular fire the boat worked for nineteen hours without stopping. The same boat, by means of this pipe system, has thrown a 2-inch stream over a ten-story building situated over 2,000 feet away. Arrangements of this character not only enable a department to cope with conflagrations on the water front, but also to protect an area nearly a mile in width."

Mr. Parsons also presents, in connection with this information about fire boats generally, a couple of tables giving results of trials of Boston fire boats, the main aim of which is to call the attention of engineers to the fact that seldom is sufficient boiler capacity allowed in vessels of this kind.

Army and navy charts of the lakes are kept in stock by the Marine Review, Perry Payne building.

Demand for High Grade Ores.

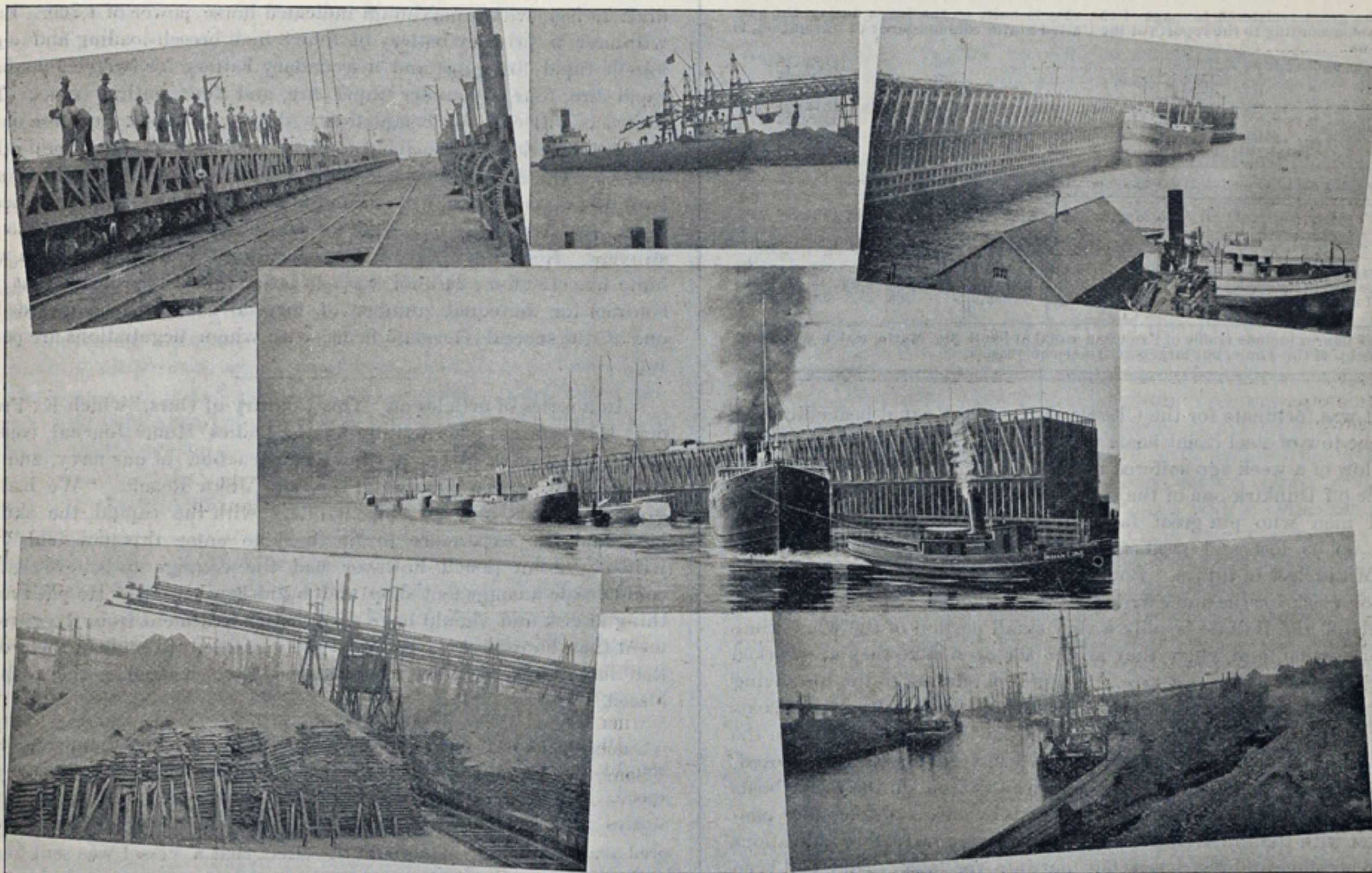
In his elaborate report to the United States Geological Survey on iron ore production in the United States during 1895, John Birkinbine, statistician and mining engineer of Philadelphia, presents some interesting figures showing the growing demand for the best grades of ore, which are those carrying high percentages of iron. He says:

"The annual production of pig iron as reported by the American Iron and Steel Association, is given to indicate the general relation between the quantities of iron ores mined and the amounts of pig iron made in each year, for most of the iron ores are smelted in blast furnaces to produce pig metal. This relation is but general, as it is affected by the stocks of domestic iron on hand, the amounts of foreign iron ores brought into the country, and the quantities of mill cinder and other materials used as ore in blast furnaces. The relation, however, as exhibited, is sufficient to indicate a growing demand for ores carrying high percentages of iron, which fact may be further emphasized by considering the quality of ores employed. For this purpose

and mill irons carry lower percentages of metal than those smelted in the production of Bessemer pig iron, the proportion of Bessemer ore will not be as great as that shown for the pig metal, but the percentages are sufficiently close to indicate the growing increase in the employment of such material.

"It would be difficult to determine closely the amount of iron ore mined which was within the Bessemer limits prescribed by the steel manufacturers, for this limit has been narrowed to meet the conditions of trade. While metal which does not exceed one part of phosphorus in 1,000 of iron by weight is by common consent within the Bessemer limit, late specifications for steel rails do not accept 0.1 phosphorus, but demand 0.085 phosphorus, and as a rule the adaptability of an ore is influenced by the phosphorus in the fuel and flux employed, as well as by the composition of other ores available at a given blast furnace.

"The combination of Lake Superior mine operators lately formed to regulate the production of Bessemer ores includes some which pro-



1. Top view of Escanaba Ore Docks.

2. Whaleback unloading at Huron.

3. Side view of Escanaba Docks.

5. Rear view of Cleveland Ore Docks, Brown Hoists.

4. New Duluth Ore Docks.

6. Brown Hoists on Ore Docks, Old River Bed, Cleveland.

(From Blue Book of American Shipping.)

a comparative statement is given below of the quantities of pig iron produced in the various years which was sufficiently low in phosphorus to be classed as the Bessemer grade, and the total outputs. As

PRODUCTION OF BESSEMER AND OTHER PIG IRONS IN THE UNITED STATES FROM 1889 TO 1895.

YEAR.	Total Production.	Product of Bessemer Grade.	Proportion of Bessemer to Total Pig Iron.
	Long Tons.	Long Tons.	Per Cent.
1889.....	7,603,642	3,151,414	41.4
1890.....	9,202,703	4,092,343	44.5
1891.....	8,279,870	3,472,190	41.9
1892.....	9,157,000	4,444,041	48.5
1893.....	7,124,502	3,568,598	50.9
1894.....	6,657,388	3,808,567	57.2
1895.....	9,446,308	5,623,695	59.5

some iron ores not within the Bessemer limit of phosphorus were used in admixture with low phosphorus ores in the production of Bessemer pig iron, and as many of the ores used for producing foundry

duce ore exceeding 1 part of phosphorus to 1,000 of iron, although the basis of sales is upon ore carrying 62 per cent. of iron and 0.045 per cent. of phosphorus, and advance prices are allowed only on such ores as give a smaller proportion than 1 of phosphorus to 1,300 of iron. However, in determining the relative values of ores produced by mines represented in this combination, all the various elements entering into the composition of the ore are considered."

Canada's marine department gives notice that the schooner Little Wissahickon, which lay in Lake Erie in about 13 fathoms, 22 miles southwest of Rondeau and 25 miles east of Point Pelee light, has been blown up by the Dominion steamer Petrel. The site of the wreck was swept to a depth of 20 feet after the masts were blown out and no wreckage was encountered.

Another big battleship for the new navy, the Iowa, built by the Cramps of Philadelphia, is now undergoing a builders' trial on the Atlantic, off the Delaware capes. The trial is for the purpose of testing the ship's stability, but she will very probably be given a speed test also. The speed requirement is 16 knots.



DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

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binders sent, post paid, \$1.00. Advertising rates on application.

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The books of the United States treasury department on June 30, 1895, contained the names of the 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.13
Sailing vessels.....	1,100	300,642.10
Unrigged.....	487	83,081.91
Total.....	3,342	1,241,459.14

The gross registered tonnage of the vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1891.....	204	111,856.45
" " " 1892.....	169	45,968.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,352.70
Total.....	347	335,433.98

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages.....	17,956	14,491	11,008	3,434	3,352	3,241
Tonnage, net registered.....	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation.....	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about 1/4 per cent. of the whole, but largely in American vessels.

It was fortunate for the Cleveland-New York canal boat enterprise that the tow of steel canal boats which they had on Lake Erie in the big blow of a week ago suffered no loss. The little boats weathered at anchor off Dunkirk one of the worst storms of the season, while some vessel men who pin great faith in sails and trim ships were giving them up as lost and predicting high rates of insurance for the balance of the fleet in future. But after all, these canal boats are the best kind of a risk for the underwriters. Their time on Lake Erie between Cleveland and Buffalo is only a very small portion of the whole time in commission, and when they are in the open lake they are worked along the shore with great care. A question relating to the life saving service comes up in connection with the anxiety caused by these boats being out in the storm referred to. The tow had put into Erie on the way to Buffalo to avoid an expected blow. Favorable weather followed, but before leaving Erie again the men in charge of the canal boats consulted the local weather bureau officials by means of telephone connection with the life saving station. There were no further indications of bad weather and the boats put out into the lake. They had been gone hardly fifteen minutes when the life saving station was notified that there were certain indications of stormy weather of the worst kind. The canal boats were then not more than two miles out in the lake but no effort was made to warn them of the danger which they were about to encounter. If the life savers had authority to charter a tug, or had other means of reaching the vessels, they could have prompted them to seek shelter. This is not written as a criticism of the Erie crew, or of life savers generally, but it would seem that as the service is intended to save life it might also be applied in some cases to the prevention of conditions that would bring about loss of life.

From present indications Capt. James Millen of Detroit will be the next president of the Lake Carriers' Association. He certainly will be accorded the honor if an arrangement can be made whereby vessel owners will be given assurance that they will not be called upon during the coming year to fight the Detroit interests that have advocated the bridging of the Detroit river. There is still a strong tendency, however, in favor of having the presidency of the association go to Chicago, and the influence of Buffalo members may yet be urged in that direction. When the association meets in Detroit in January it is quite probable that reports will show a membership during 1896 of more than 700,000 net tons, as against about 600,000 net tons at the

close of 1895. This is a creditable increase, upon which the executive officers of the association are to be congratulated, but there is still a very large amount of tonnage, represented by first-class vessels, that is not in the association, but which should bear its share of the expense attending the kind of work in which the organization is engaged. Time and money are spent by the officers of this association on legislation and in dealings with the government, all of which is for the benefit of the entire lake marine. Mr. James Corrigan and other active members in Cleveland have taken up the task of assisting President J. J. H. Brown in inducing vessel owners who are not now in the association to list their vessels.

Japanese naval attaches in this country have finally concluded all arrangements with the Cramps of Philadelphia and the Union Iron Works of San Francisco for two armored cruisers. The vessels will be modeled after the Yoshino, recently built by the Armstrongs, English ship builders. They will each cost \$1,250,000, be of 5,700 tons displacement, and attain a speed of 21 knots. The length on the water line will be about 330 feet; extreme breadth 51 feet, and mean draft 20 feet, with a maximum indicated horse power of 1,700. Each will have a primary battery of four 8-inch breech-loading and eight 5-inch rapid fire guns, and a secondary battery for twelve 6-pounder rapid fire, four 1-pounder rapid fire, and four gatling guns. The contracts will call for completion within two years. Japanese naval attaches in Europe are about to close negotiations for several other vessels. The Armstrongs will build a twin ship to the Yoshino, and two first-class battleships. Yarrow will probably be awarded contracts for five 150-ton, 24-knot torpedo boats, and several torpedo destroyers. Normann & Co. of Havre, leading French ship builders, will build five 150-ton, 24-knot torpedo boats, and it is probable that the contract for an equal number of torpedo boats will be awarded to one of the several German firms, with whom negotiations are pending.

In a series of articles on "This Country of Ours," which Ex-President Harrison has been writing for the Ladies' Home Journal, considerable attention is given to the reconstruction of our navy, and the ex-president pays a tribute to the late John Roach. "We had no great ship yards, and no ship builders with the capital, the skilled labor and the experience to fit them to enter this new field," he writes. "John Roach, however, had the courage to believe that he could create a competent shop and build new vessels. He put everything at risk and should have had better treatment from the government than he received. He was fairly entitled to some of the profits that have since accrued to those who have walked in the path he blazed."

In the early days of the screw propeller big diameters were sought on the theory that the greater the diameter the greater the speed. This theory was, of course, soon discarded, and some of the stories told as to how the efficiency of the smaller screw was discovered are interesting. One is to the effect that a vessel was sent to sea with a screw so large that it was deemed best to cast each blade in two parts and then weld them together. During a storm all three blades of the propeller broke at the welding, reducing the diameter by more than two-thirds. To the surprise of the captain, the vessel shot forward at a speed such as had never been attained before. Engineers then experimented with small propellers and discovered that they were much more effective than large ones.

Although our own navy has investigated and laid aside the question of oil for fuel, the German authorities are about to equip several of their vessels with appliances for using oil and the British admiralty is also disposed to conduct experiments along this line on an extensive scale. A British third-class cruiser is to be fitted with apparatus for consuming the oil. The chief difficulty, according to reports from England, has been to prevent objectionable smoke and smell, but it is claimed that this difficulty is now being avoided to a very great extent, or at least considerably modified.

Probably no line of securities listed in New York was more favorably affected by the result of the election than those known as the iron stocks. Minnesota Iron Co. and Illinois Steel scored big advances and are now almost double what they were several weeks ago.

The Review has excellent photographs of lake ships.

In General.

The Jackson & Sharp Co. of Wilmington, Del., has just launched a freight steamer 150 feet long for the Commonwealth Transportation Co. of Philadelphia. Machinery will be furnished by Neafie & Levy of Philadelphia.

The Elsa, a small steamer from Sandusky, is now in Chicago preparing for a trip via the Mississippi to Central America for service on the Gulf of Mexico. The boat will get new steeple compound condensing engines in Chicago and will also be provided with Worthington air and circulating pump, Lunkenheimer steam fittings, etc.

It would seem that there must be some gross carelessness attending the large number of accidents that have befallen big war vessels like the costly battleship Texas, which was sunk at a dock in the Brooklyn navy yard a few days ago. Accidents of this kind are rare on merchant ships, as it is well known that the result would be a wholesale discharge of officers and men who were in any way responsible for the loss.

At the sixth annual meeting of the American Society of Mechanical Engineers in New York recently, Mr. Albert Kingsbury, Durham, N. H., presented a paper in which some important points with reference to graphite as a lubricant were brought out. Reports of tests made on a specially designed machine with lard oil, mineral oil, oil and graphite, etc., showed a great lessening of friction by means of graphite. The Joseph Dixon Crucible Co. of Jersey City, N. J., has prepared a small circular that deals with these tests. It will be sent to any address upon application.

"In time past," says the Louisville Courier Journal, "nearly every boat on the Ohio river carried a pet of some kind, in the shape of an animal, as a sort of emblem of good luck. One would carry a dog, another a hog, another a goat and so on, and many boats of the present day continue the practice. One of the Cincinnati packets carries a pair of fine, fat porkers, which were born on the boat and raised by the deck hands giving them milk from bottles. They often go ashore at way landings when the boat is taking on freight, and are the first to get aboard as soon as the bell rings to leave."

Fuel Cost of 8½ cents per Mile.

Mr. T. C. Burrows, chief engineer of the steamer Marquette, owned by John W. Moore and others of Cleveland, is elated over the success of the Howden draft in his boat. In a letter to Mr. C. B. Calder, superintendent of the Dry Dock Engine Works, Detroit, he says: "I write to give you a few points in regard to the working of the steamer Marquette. Since your company compounded the engines, and furnished the new boiler fitted with the Howden system of draft, we are making twelve turns more per minute than we made before, an increase of one mile an hour in speed, and we are using less than half the amount of coal previously used. We are using slack coal, and at a cost of \$1.60 per ton. We have been running for 8½ cents per mile for the round trip. After using the Howden system of draft for four months, I can say that in my judgment it is a great success. It gives very little trouble, and furnishes you with a convenient and effective means to handle your steam pressure. And another of its features is, that while lying in port with a banked fire, it takes very little coal, and as long as we keep a bank we always have steam. But I think I will have to give the magnesia covering credit for that. The engine works very satisfactorily, although I could suggest some improvements if I was asked to do so."

A Rare Admission from England.

The European press, and amongst them, we are sorry to see, many English papers, have effected to laugh at the idea of American warships forcing the Dardanelles. Ignoring for the moment the political aspect of the question, we would ask: "Have not those who scoff lost sight of the fact that the American navy is daily becoming a greater power than they care to acknowledge?" It is barely two years ago since an American firm asked, in all good faith, to be allowed to compete for the construction of British warships, a request which raised a storm of ridicule in our papers; and now, almost before the merriment has ceased, the same firm with another concern in America have about closed contracts to build two 7,000-ton cruisers for the Japanese government, vessels which, be it noted, will have to be completed in as short a time as any English firm would care to undertake delivery in. The American navy may be a small one today, but

we who speak the English tongue ought to be the last to undervalue the marvelous potentiality of a nation which entered upon the great struggle of 1860 with a mere handful of men only to leave off four years later with armed forces whose numbers alone caused the whole world surprise. As with her men, so it may be with her ships, should the requirement for them ever arise—a requirement which, as a kindred nation, we pray may never come.—Shipping World, London.

For Good Eating's Sake.

The unique system described herewith has been adopted by a railroad company to have its dining car service up to the best. It might be followed with advantage on some lake passenger steamers. The plan is set forth in an extract from the Locomotive Engineer of New York city, a paper of recognized authority in technical railroad matters.

"In connection with the through train service between Chicago, Buffalo, New York and Boston the Nickel Plate road run their own eating cars, and they have adopted a rather unique manner of keeping the men in charge of the cars up to the mark. There is a grievance committee, consisting of two superintendents, the superintendent of motive power, the regular traveling representatives and the general car inspector, who have authority to take a meal in the cars at any time and report on anything they find wrong. These officers make life a burden to the superintendent of the dining cars. There is a good deal of pleasantries about the criticisms, but those patronizing the cars find that they never have reason to complain of the victuals being cold or out of season. The dining car service on the trains of the Nickel Plate road is something that strikes the traveler as approaching perfection. With the system in force referred to, there is not much room for a 'kick' from anybody.

"In conjunction with the above we feel justified in adding our compliments to the painstaking management of the Nickel Plate road. It has been our good fortune to have occasion to use this line in our frequent trips from Chicago to New York city and Boston. While traveling in one of the day coaches in a little jaunt from a local station into Buffalo, I was impressed with the cleanliness of the car. The secret was soon divulged. A long came a colored porter in uniform, dust cloth and brush in hand, and with a polish here and a wipe there, the seats, the window sills, and floor were kept scrupulously clean. The schedules of their fast trains are convenient, and the sleeping cars placed in the regular daily service are of the most luxuriant type of modern construction. Solid trains are run between Chicago, Buffalo, New York city and through sleepers to Boston. A fact worthy of note yet remains to be pointed out to the readers of this journal, which, perhaps, has not come to the notice of many. Rates are offered between the same points lower than those quoted by competitors of the Nickel Plate road, and from my experience their passenger facilities are excelled by none."

In connection with the announcement of another dividend from the Roberts Safety Water Tube Boiler Co. of 39 Cortlandt street, New York, it is noted that this company, which was incorporated Nov. 1, 1890, has built nearly 900 boilers, ranging from those suitable for small launches up to installations of nearly 2,000 horse power in one vessel. The capital stock of this company is \$250,000 and the sixth consecutive annual dividend of 10 per cent. was declared on the first day of this month by the board of directors, notwithstanding that the last three years have been years of unusual business depression. It is claimed that the works of this company are larger than any other plant in the United States devoted exclusively to the construction of marine water tube boilers. The tools are of the most modern type, nearly \$30,000 having been expended in adding to the equipment in this line during the past year. Although the Roberts company owns a number of patents on water tube boilers, it has been their experience, that, all things being taken into consideration, the original type gives the best satisfaction, with some slight improvements in construction and material. With the possible exception of one different type which has since been practically discarded by its manufacturer, the Roberts boiler is the father of all marine water tube boilers now being manufactured in this country. The original boiler, built by Mr. Roberts in 1879, is still in use, although it is infinitely inferior to anything built at the present day. This company has an enviable record in view of the fact that not one of its boilers has ever killed a man or produced a disastrous explosion.

Shoals, Lights, Fog Signals, Etc.

As a result of striking bottom near Squaw island, Lake Michigan, the Ogdensburg Transportation Co.'s wooden steamer Wm. A. Haskell has been undergoing repairs at Miller Bros. dry dock, Chicago, that will cost about \$14,000. Capt. Daniel Murphy says that his boat was about half way between Squaw island reef and Lansing shoal when she struck. The Lake Carriers' Association has been endeavoring for two or three years past to have aids to navigation of some kind established in this vicinity. It would seem that this accident should be evidence enough of the necessity of having the place marked.

Vessel captains report as a dangerous obstruction to navigation off Chicago harbor the new crib recently sunk in the lake off Chicago avenue. The crib is used in the construction of the new waterworks tunnel, and according to reports of several captains is not lighted at night. The captain of the Ogdensburg Transit Co.'s steamer H. R. James reports that he came very near striking the crib while running at full speed.

Welland canal authorities have issued an order restricting the draft of vessels passing through the canal to 13 feet 6 inches. It was formerly 13 feet 9 inches.

Notice of a fog signal at North Manitou light station will be received with a great deal of satisfaction by vessel masters trading to Lake Michigan. About Nov. 20 a 10-inch steam whistle will be established at the light station in course of construction on the point making off to the eastward from the southeasterly part of North Manitou island, to sound, during thick weather, blasts of five seconds duration separated by silent intervals of twenty-five seconds.

About Nov. 16, the light and fog bell towers on the south pier at the harbor of Frankfort, east side of Lake Michigan, will be moved along the extended pier to a point near its outer end, and about 600 feet from their present positions. The light will be shown and the fog bell sounded, each from its respective tower as heretofore.

On account of a leak in the gas buoy established by the Canadian government at Southeast shoal, near Point Pelee, Lake Erie, the supply of gas has given out earlier than was expected, and as provisions for refilling these buoys will not be made until spring, it has been thought best to remove the unlighted one, in order to avoid the danger

of some vessel running into it and sinking it. The "blinker" on the middle ground in Pelee passage is still lighted and is, of course, the more important of the two buoys.

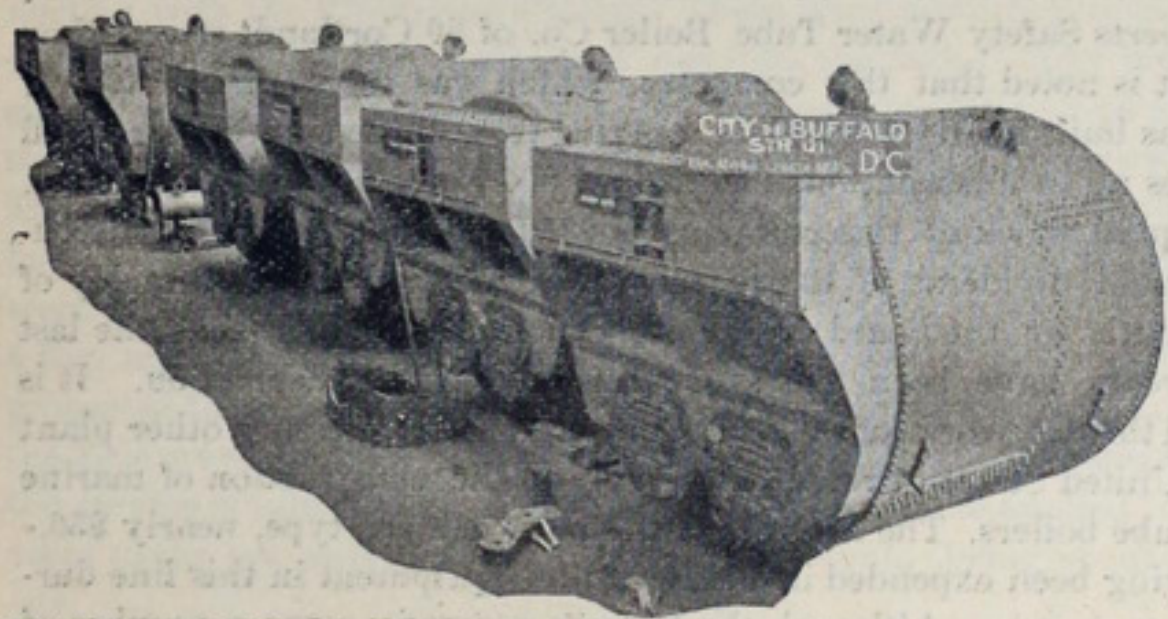
New iron furnace interests at Buffalo and Tonawanda are gradually increasing ore shipments to the lower end of Lake Erie. The Tonawanda Iron and Steel Co.'s new stack at North Tonawanda, which was put in blast a few days ago by an electric spark from a wire connected with the home of President-elect McKinley at Canton, will have a daily capacity of about 250 gross tons of foundry iron. It is 80 feet high and 18 feet diameter at the base. It is equipped with three of the Kennedy-Cowper type of hot blast stoves, each 80 feet in height by 18 feet in diameter. The blowing engine is the largest ever built. It was designed especially for this plant by Julian Kennedy, engineer, and built by the Lake Erie Engineering Works of Buffalo. The engine is over 40 feet in height and weighs 385 tons. It embodies several new principals and has excited considerable interest in iron circles.

Members of the Civil Engineer's Club of Cleveland talked of shipping and ship building at their meeting Tuesday night. The discussion was based on a paper read by Joseph R. Oldham. Mr. Oldham directed special attention to the great age of the U. S. S. Michigan, the only war vessel on the lakes, which he claims is the oldest steamer now in active service in the world. The Michigan was put together at Erie, Pa., fifty-two years ago. This was before the celebrated Great Britain had crossed the ocean, and in the same year that the first Cunard steamship made her initial trip to Boston.

Immediately following the election directors of the Carnegie Steel Co. decided to push the work of completing into Pittsburg the Conneaut ore and coal railway, in which they became interested some time ago. The extension and improvement of this railway, with the terminal facilities at Conneaut, is said to involve an expenditure of \$3,500,000. It is also announced that the Carnegie company will proceed with the building of two additional blast furnaces and will expend more than half a million dollars in improvements at its plant. Expenditures of all kinds authorized at the company's works exceed \$1,250,000.

Air is Cheap—Cheaper than Dirt!

FUEL IS DEAR—VERY DEAR! USE AIR AND SAVE FUEL!



Six Boilers with Howden Hot Draft appliances now in Side-Weel Steamer City of Buffalo. Dimensions of each boiler—12 ft. 6 in. diameter by 12 ft. length.

ECONOMY in operating expenses on Lake Ships must come from reduced coal bills. No great saving can be made in labor cost, and provisions are already low. But fuel bills can be lowered and cheap coal used to advantage by adopting Modern Methods of making steam at low cost.

No manufacturer of pig iron would to-day think of running his furnace without a hot blast. Competition would not permit it. This same competition demands advanced practice in the operation of ships. The same principle is applied in the

HOWDEN HOT DRAFT

Now in use on Lake Steamers aggregating over 40,000 Horse Power.

CAN BE APPLIED TO OLD SHIPS AS WELL AS NEW ONES.

No complicated machinery. Cool engine rooms and cool fire holds. Estimates readily furnished for application of this draft to any steamer.

DRY DOCK ENGINE WORKS, DETROIT, MICH.

IF YOU HAVE MONEY TO BURN

You can burn it in the boilers of your steamers without knowing it until the fuel bills come in. If not you will be interested in

AN INVESTMENT THAT PAYS 20 PER CENT.

Take all your fuel bills for the season and add up the amounts. If you have a modern steamer divide the total by 5, and the result will be

THE AMOUNT OF MONEY YOU "BURNED" THIS SEASON,

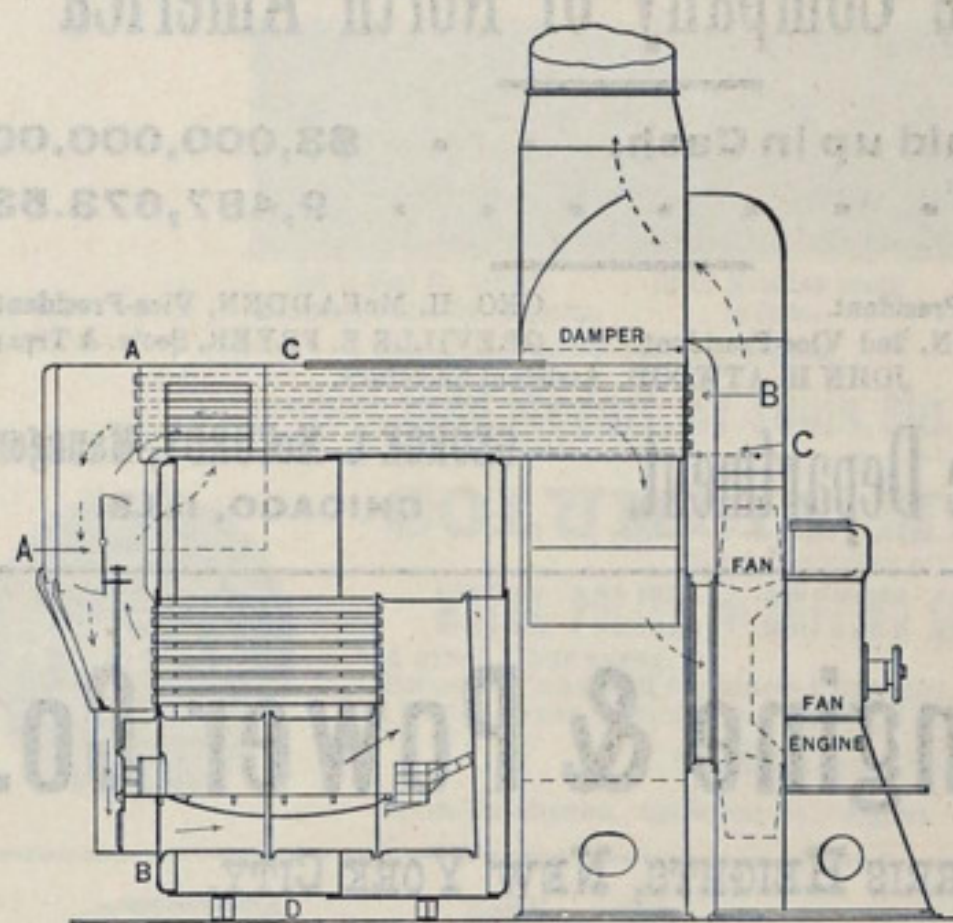
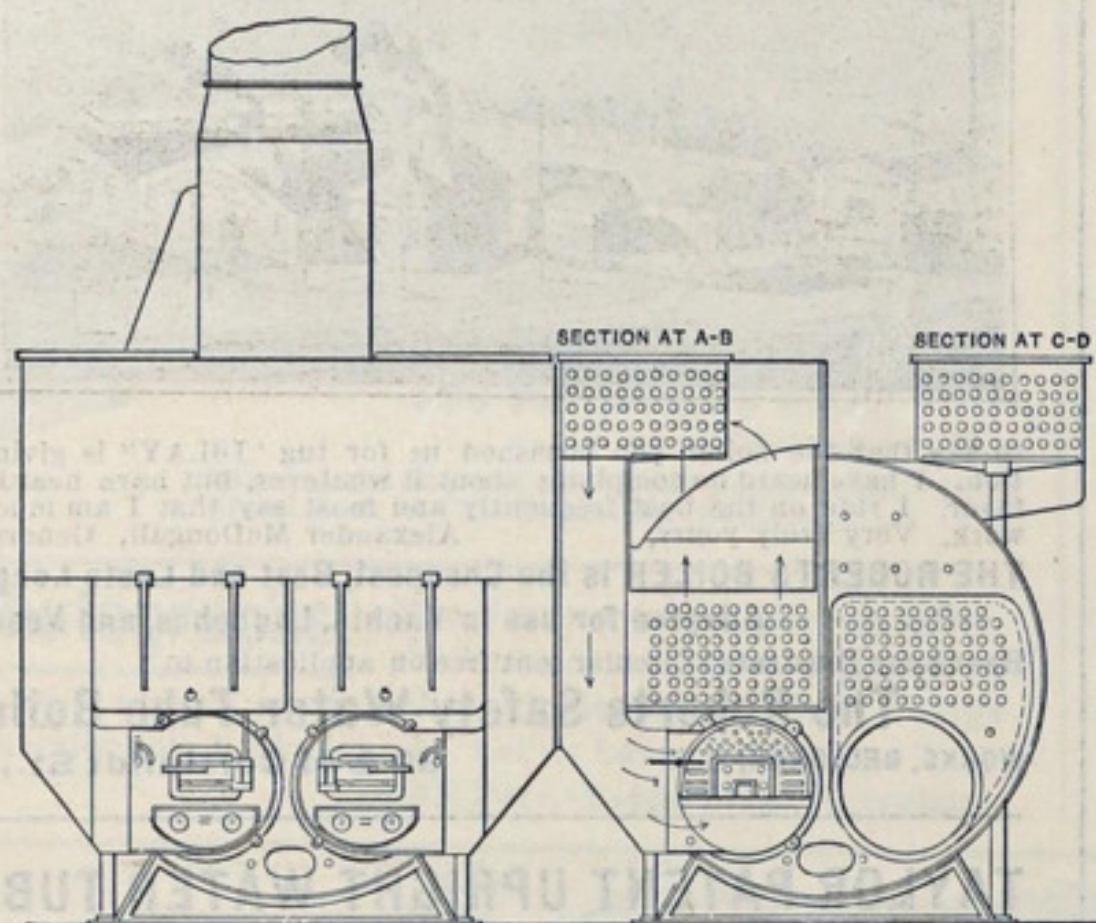
And the amount you can save next season by having your steamer equipped with the

ELLIS & EAVES SYSTEM OF DRAFT.

If you are interested in reducing the fuel consumption of your steamer to the lowest possible point, divide the total of the season's fuel bills by 3, and after looking at the result figure how much you can afford to pay to have your boilers retubed with

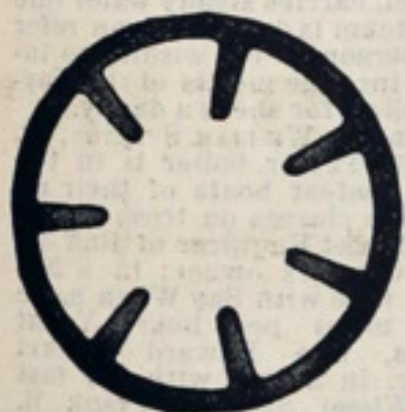
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In addition to having the Ellis & Eaves system of draft. The draft will save 20 per cent. of the fuel and the tubes from 10 to 15 per cent. additional.



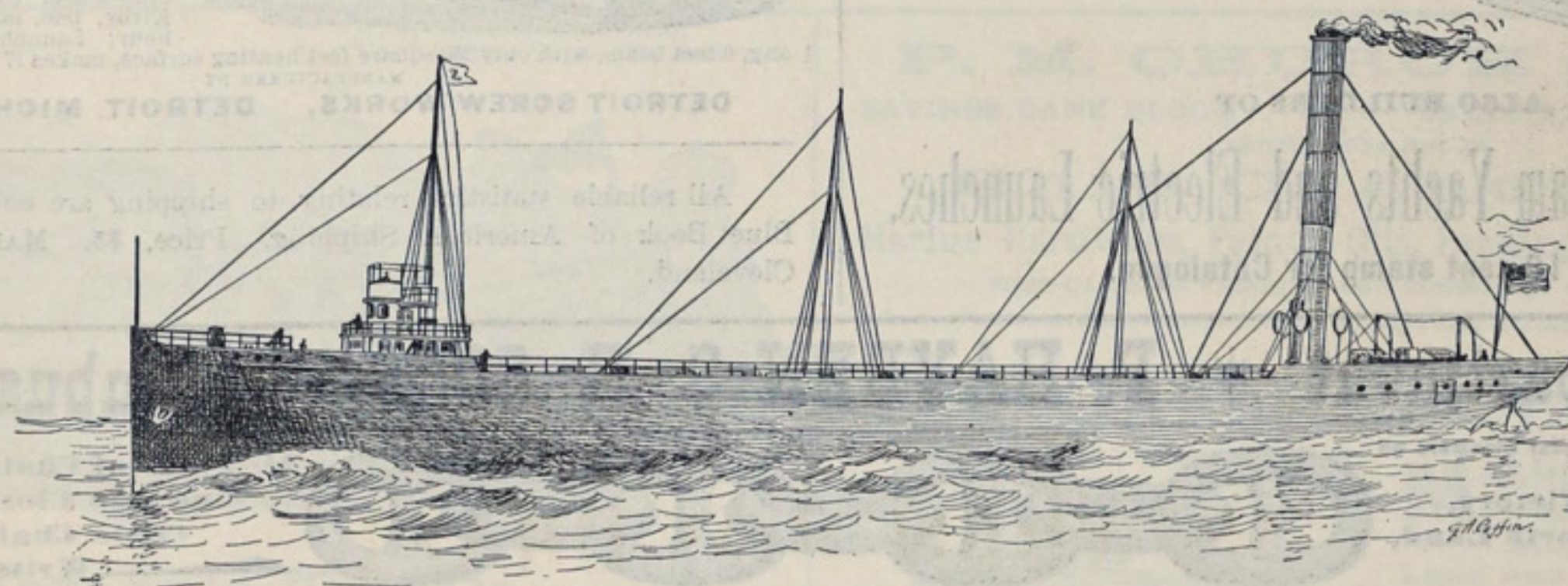
IF YOU ARE SKEPTICAL

You can refer to a table on pages 196-97 BLUE BOOK OF AMERICAN SHIPPING, which gives the coal consumption of ten modern lake steamers an average of 2.22 pounds per horse power per hour.



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See MARINE REVIEW Oct. 22, fitted with the ELLIS & EAVES DRAFT, shows a consumption of 1.79 pounds—a saving of 20 per cent. with plain tubes. With SERVE TUBES and subtracting for auxiliary machinery, this can be reduced to 1.5 pounds, a saving of 33 1/3 per cent. The simplicity of this system of draft and the construction of the tubes will commend themselves to the most practical ship owners, builders and engineers, when it is known that it consists merely in making the natural draft stronger—not forcing but inducing it.



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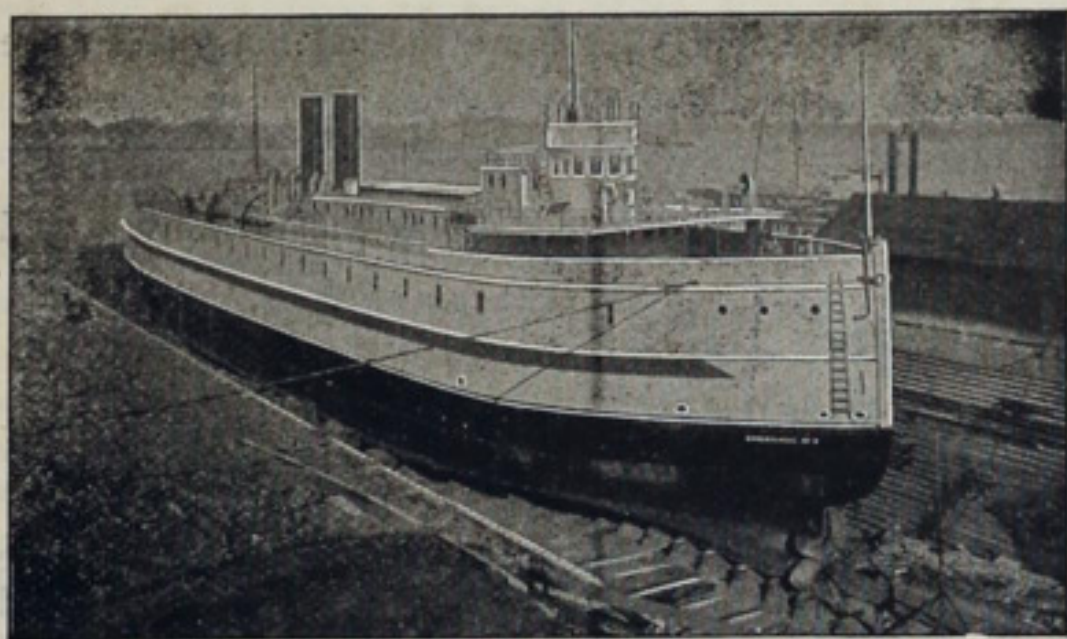
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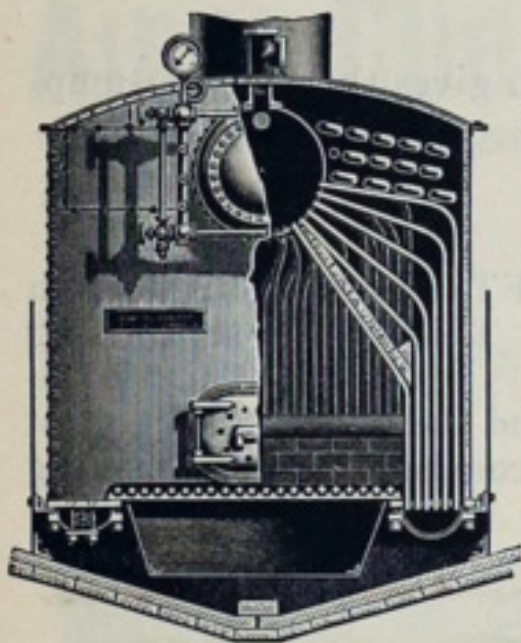
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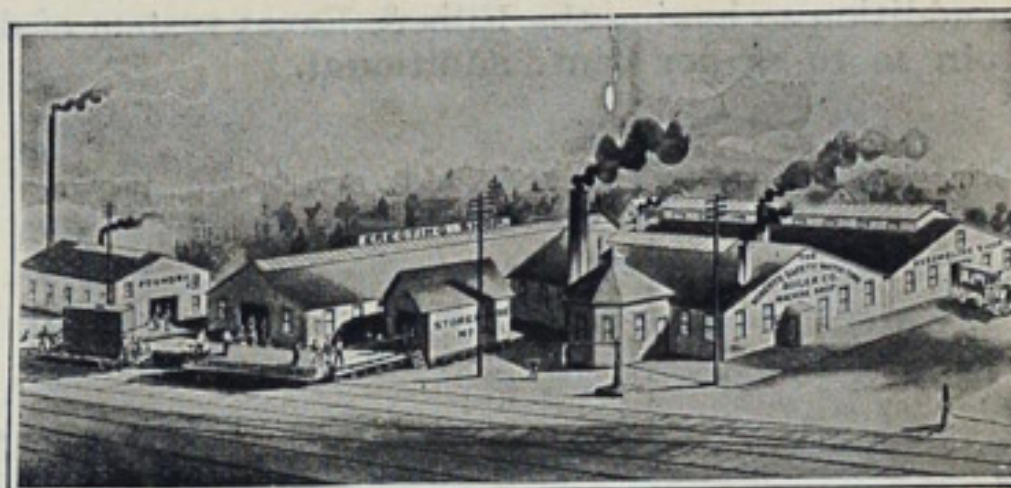
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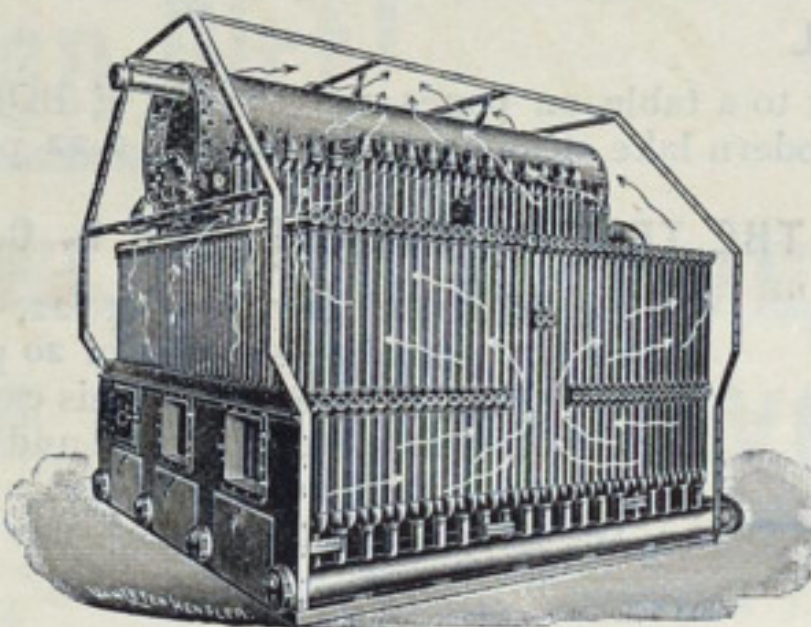
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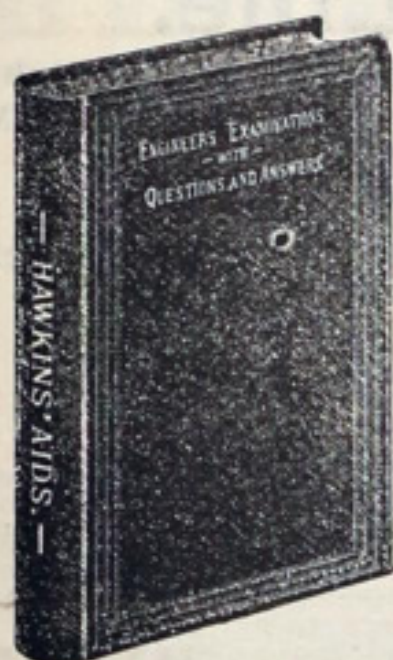
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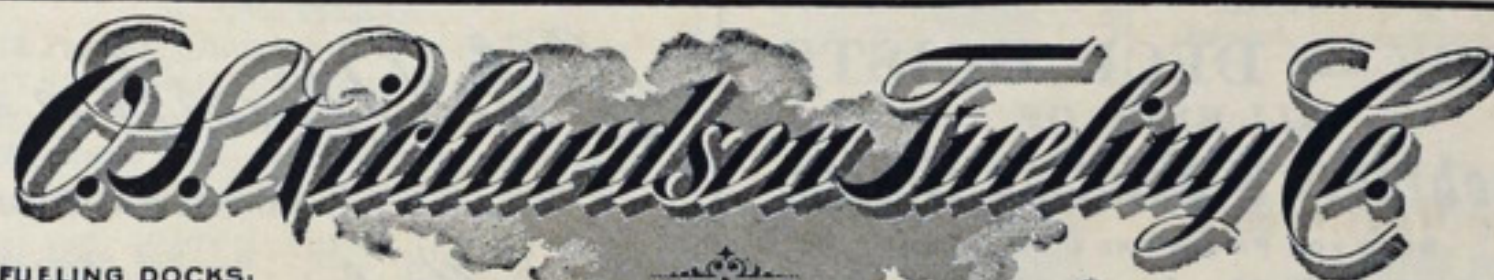
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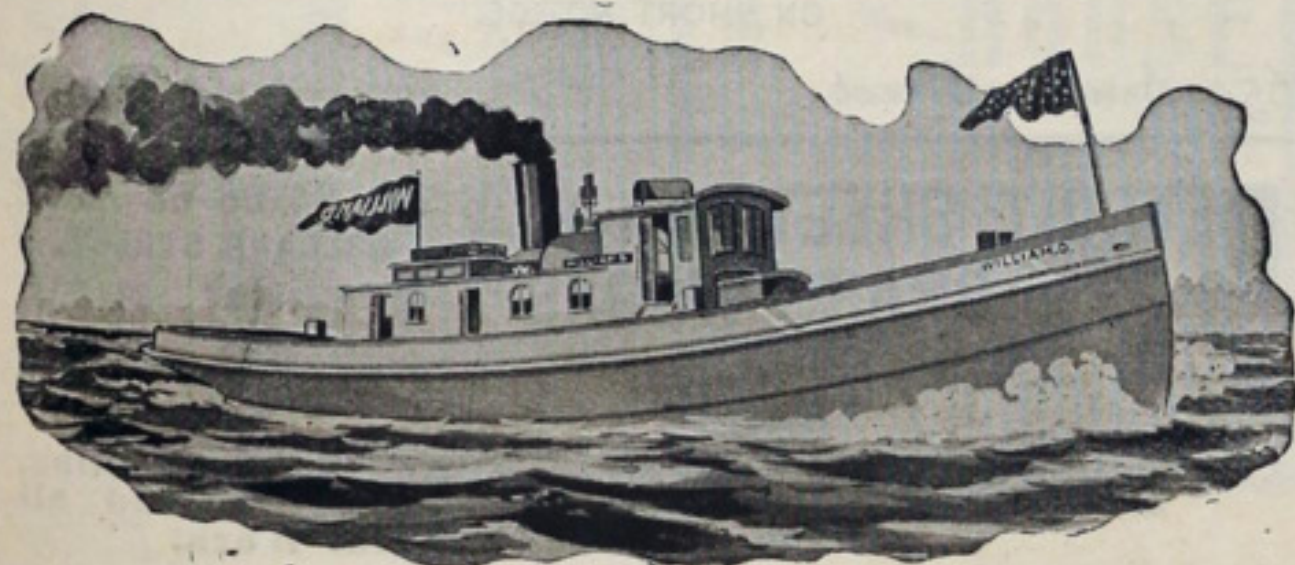
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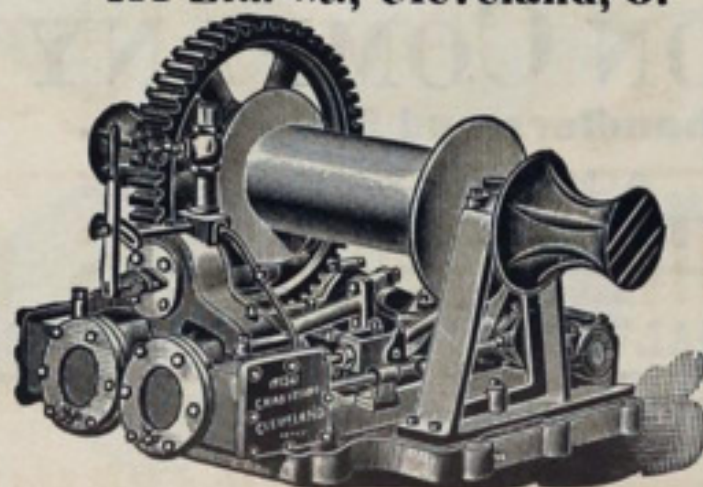
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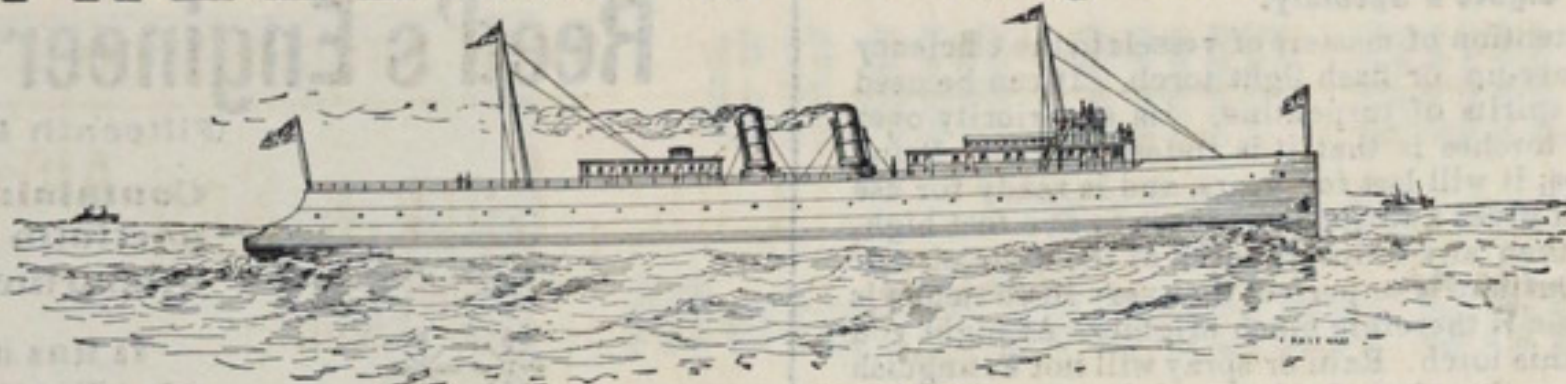
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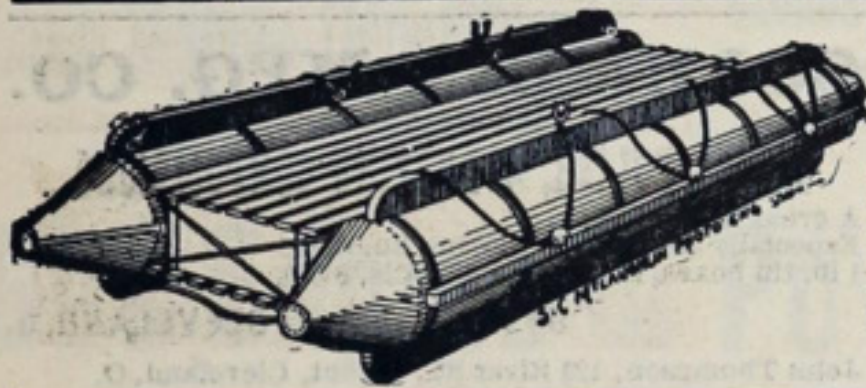
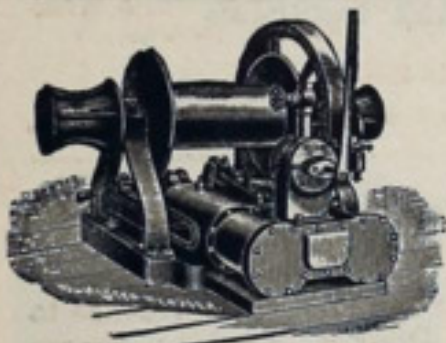
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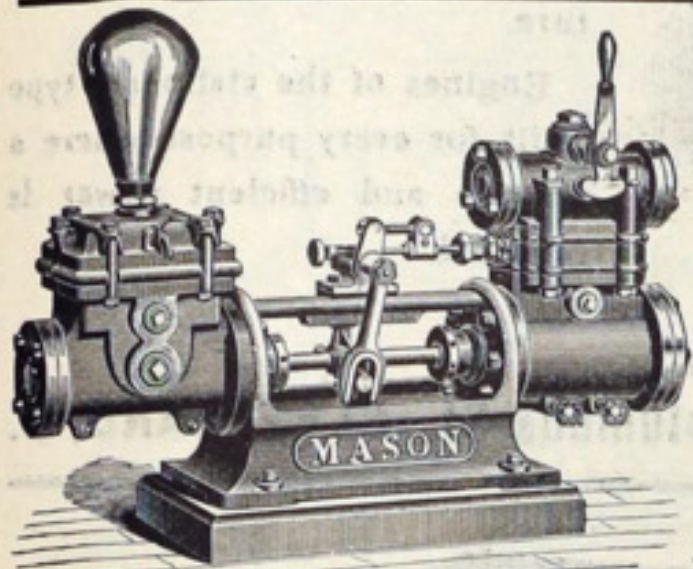
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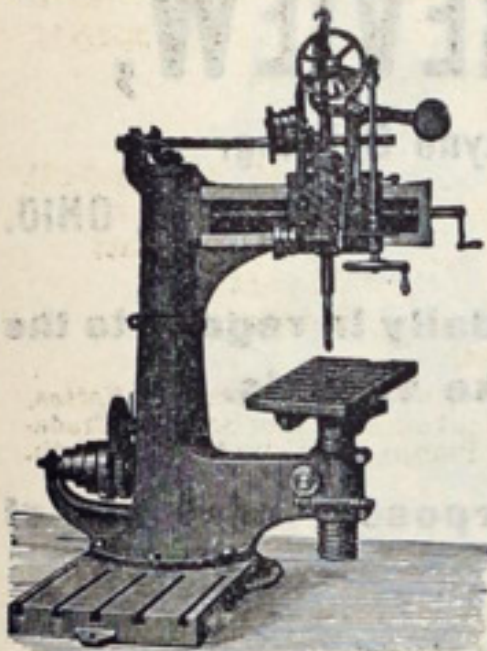
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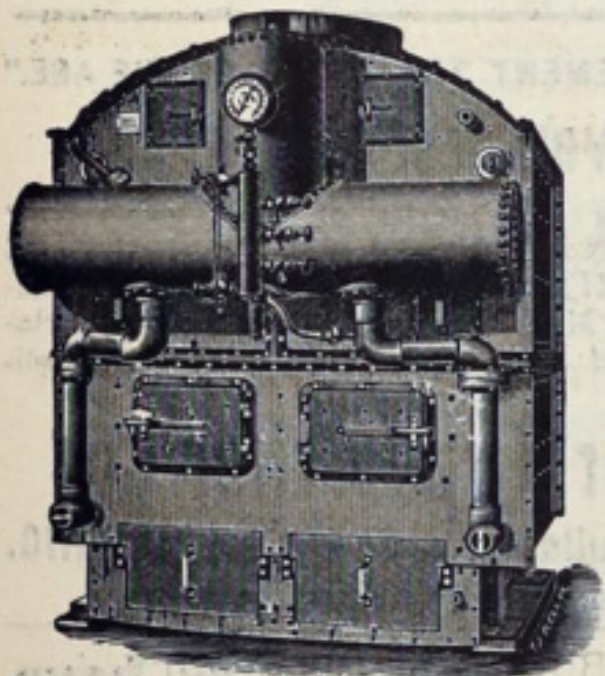
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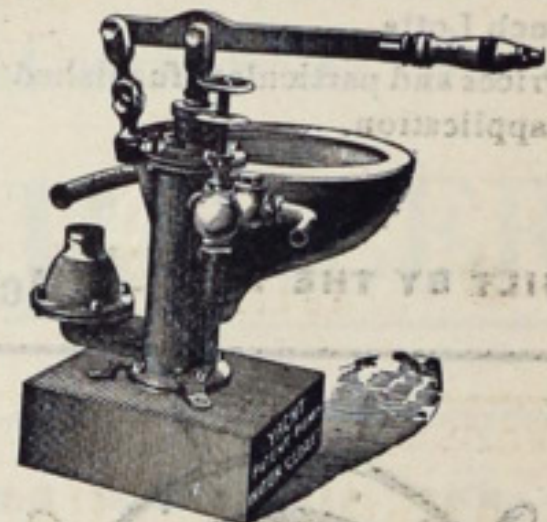
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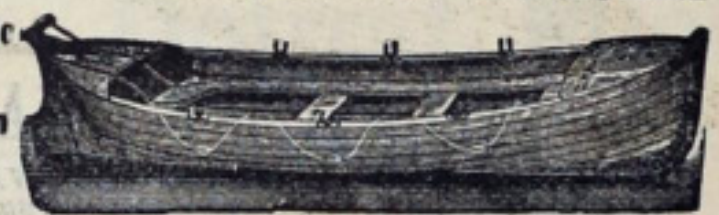
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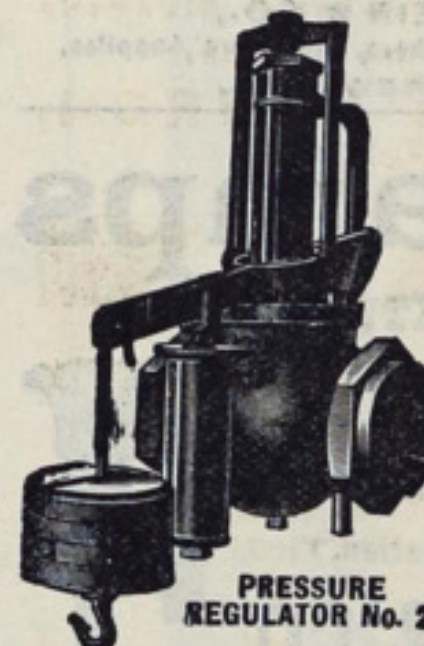
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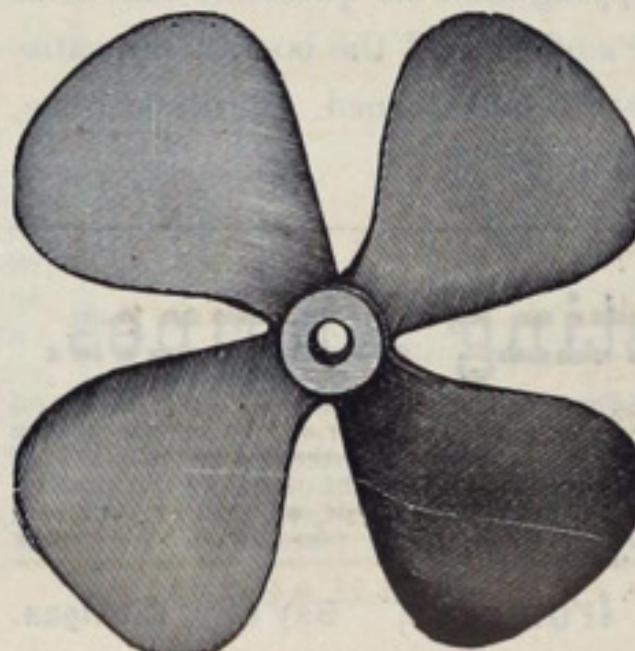
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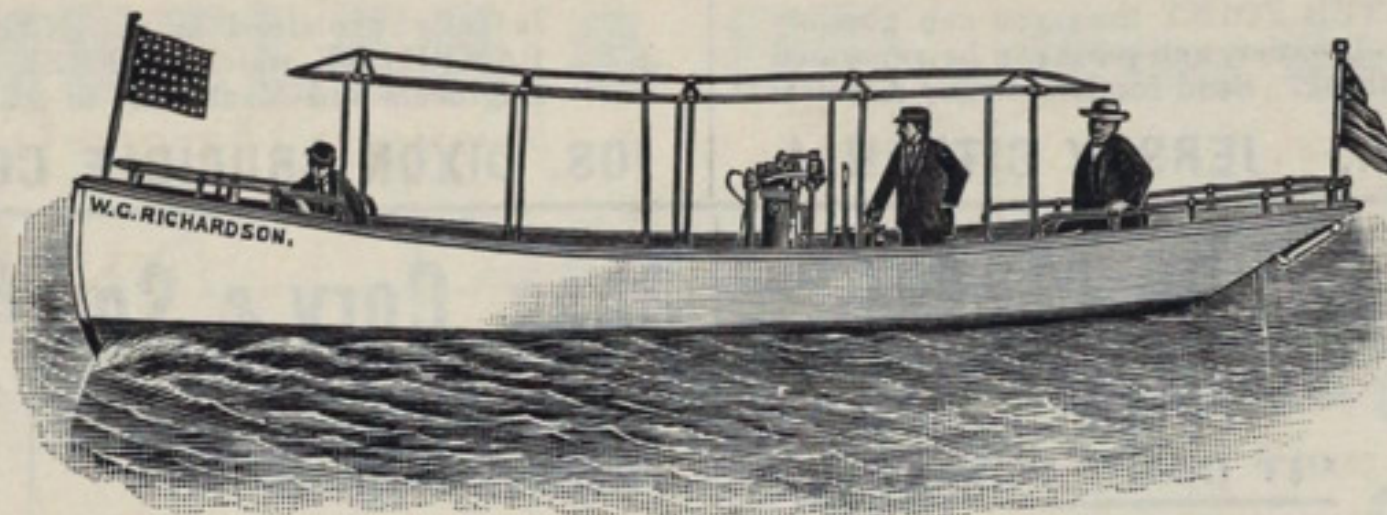
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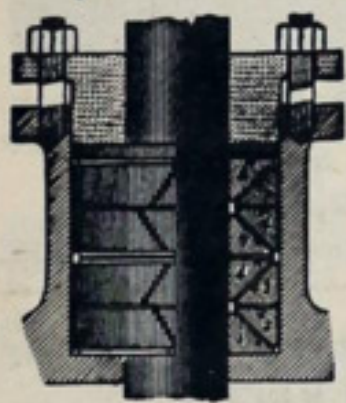
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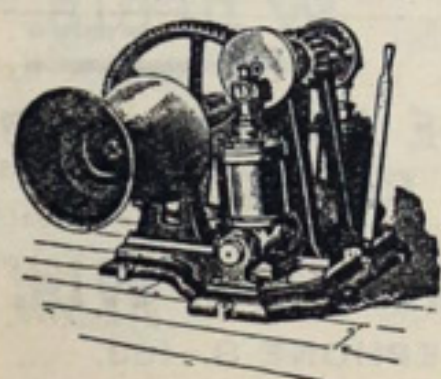
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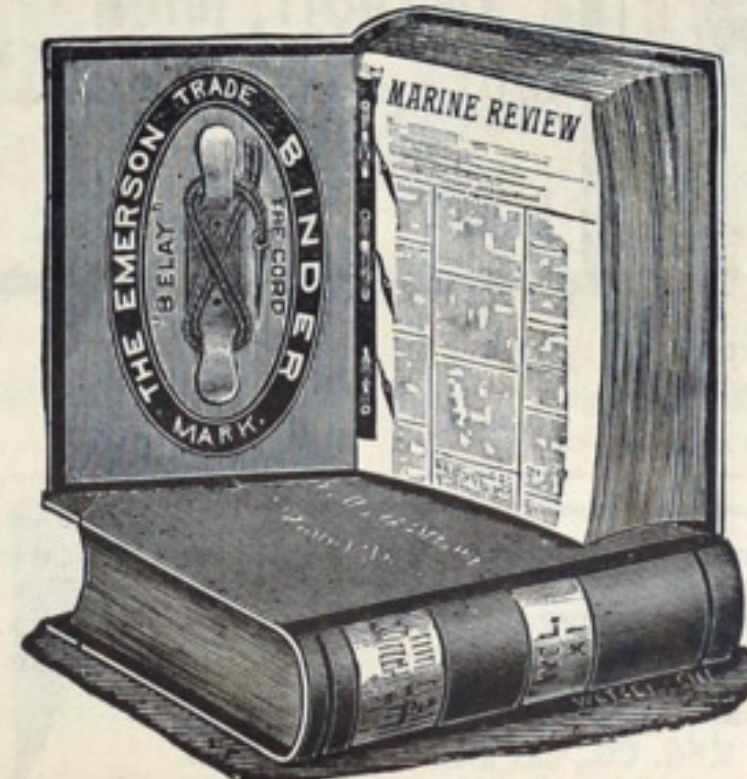
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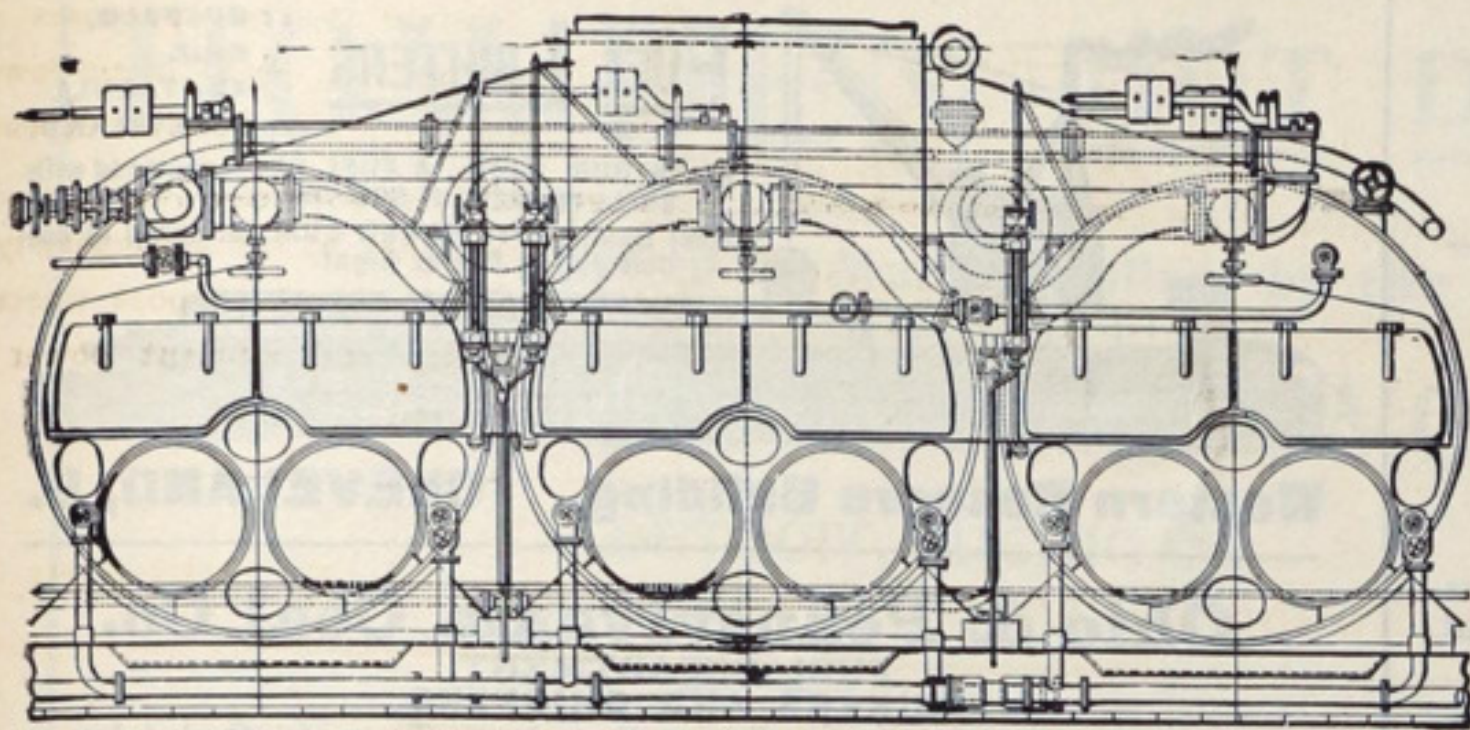
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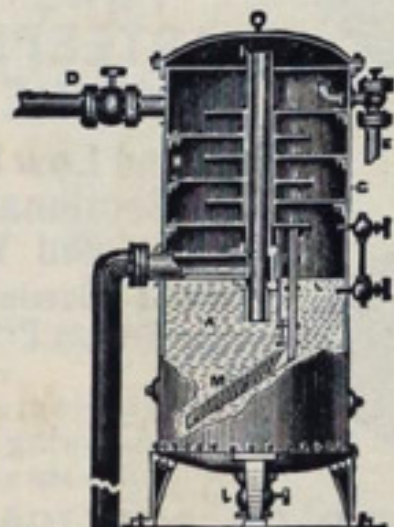
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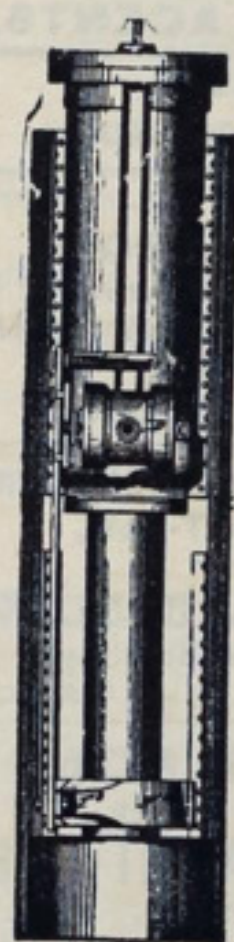
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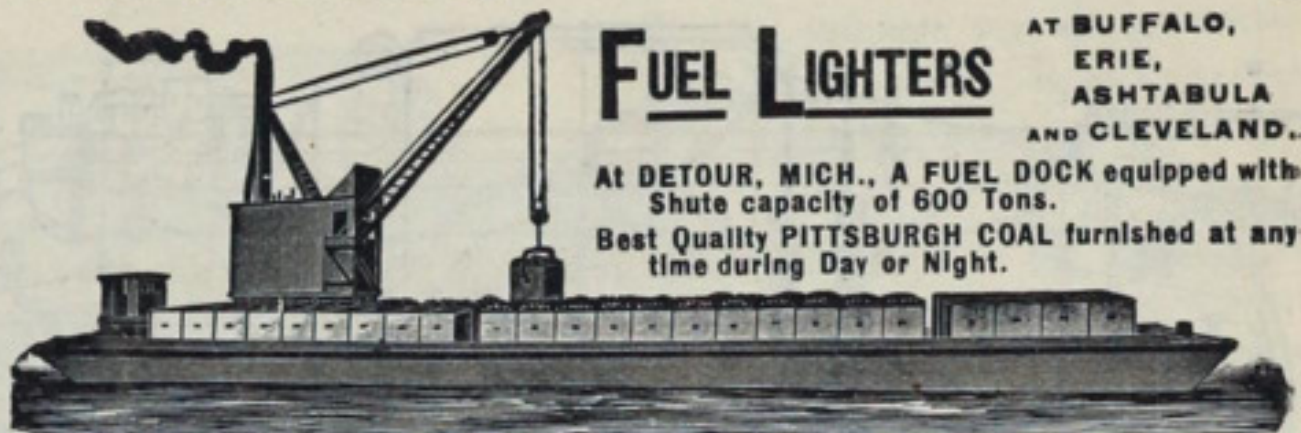
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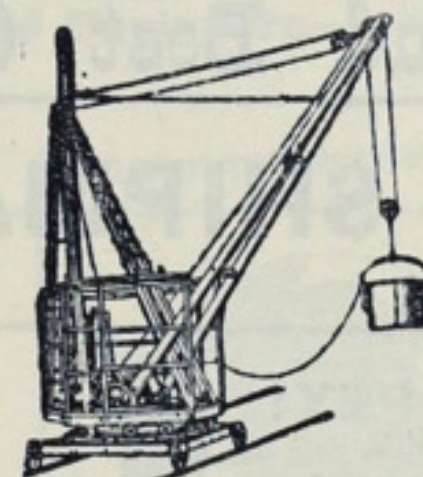
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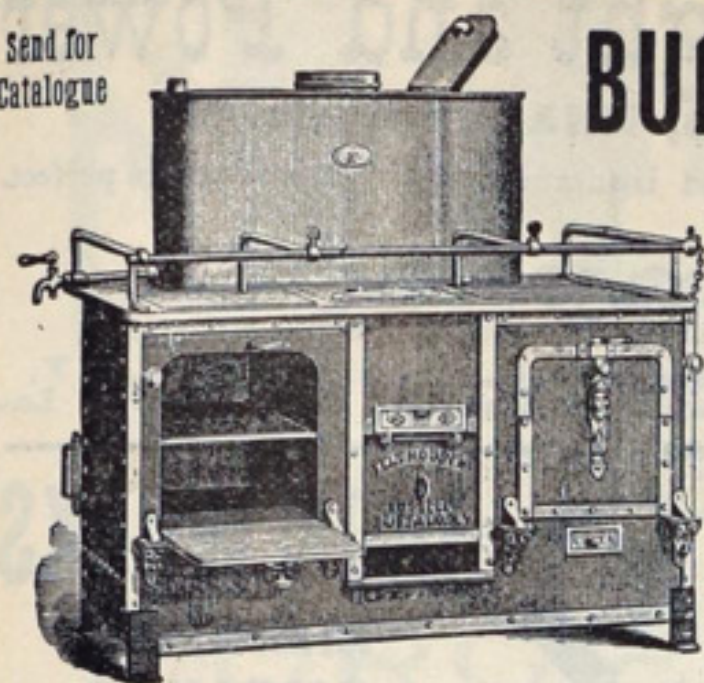
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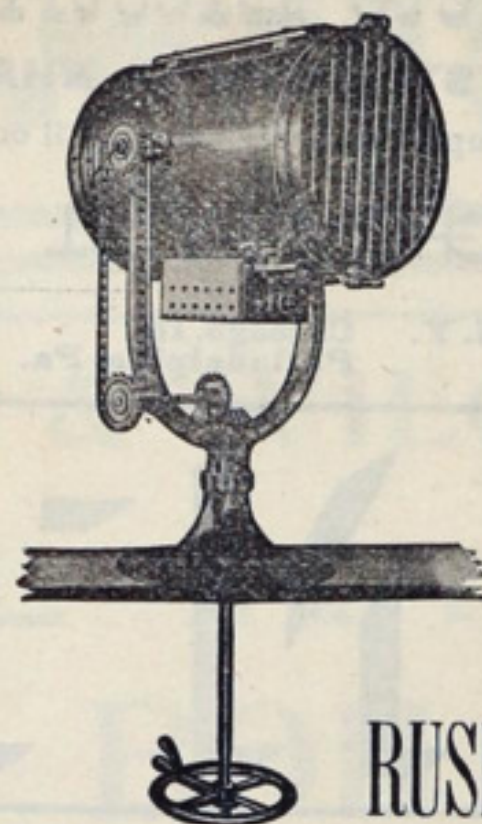
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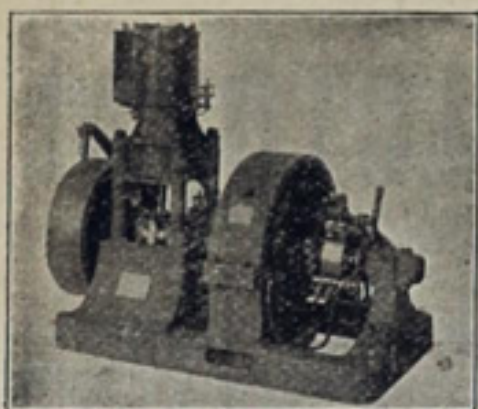
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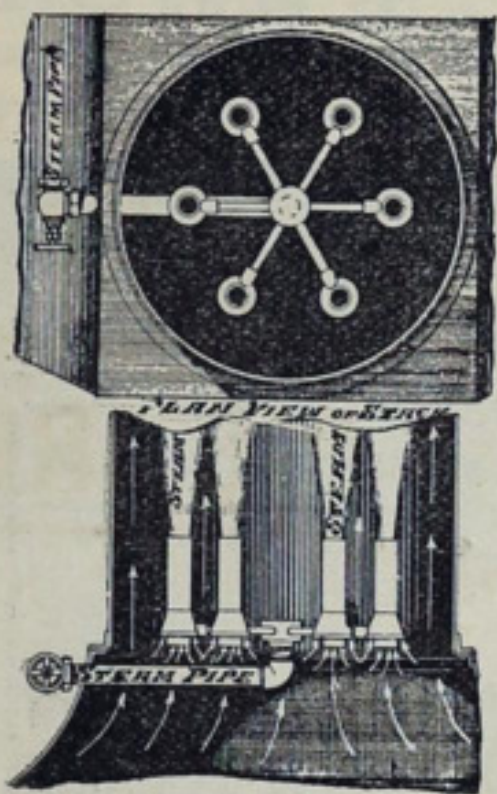
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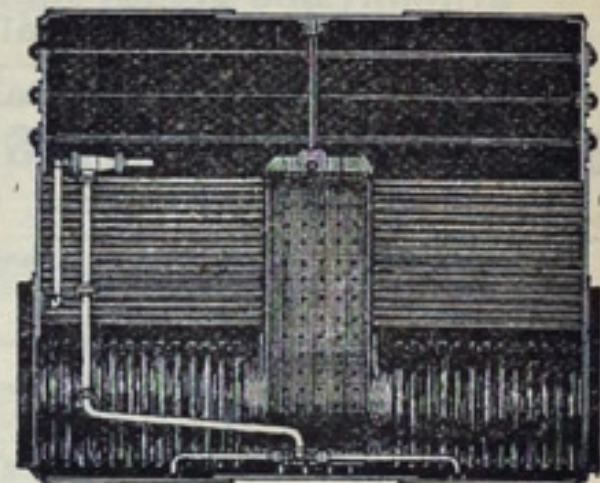
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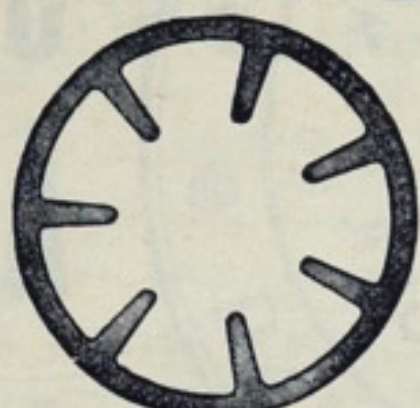
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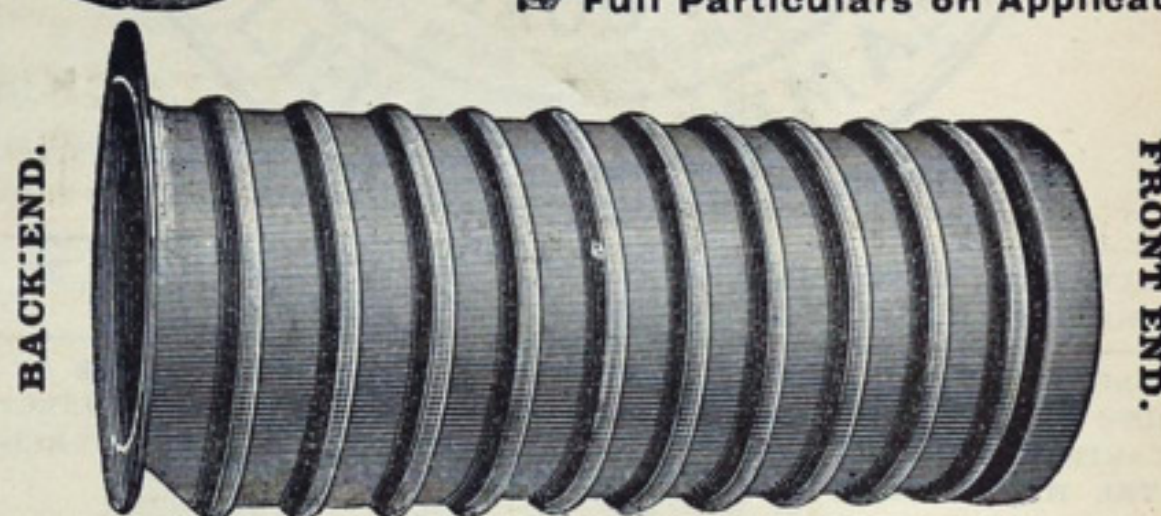
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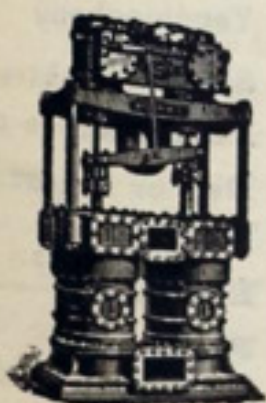
UNITED STATES ENGINEER OFFICE,
366 Milwaukee St., Milwaukee, Wis., Oct.
27, 1896. Sealed proposals for: Kewaunee Har-
bor, Wis., 425 feet pile pier extension; Manito-
woc Harbor, Wis., 540 feet crib pier extension;
South Milwaukee Harbor, Wis., 180 feet pile
pier extension; Racine Harbor, Wis., 250 feet
crib pier extension; Kenosha Harbor, Wis.,
250 feet crib pier extension; will be received
here until 12 o'clock noon November 27, 1896,
and then publicly opened. Information fur-
nished on application. GEORGE A. ZINN,
Capt., Engrs. Nov 21

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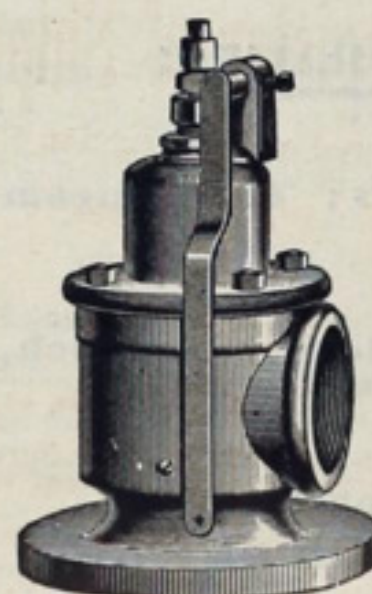
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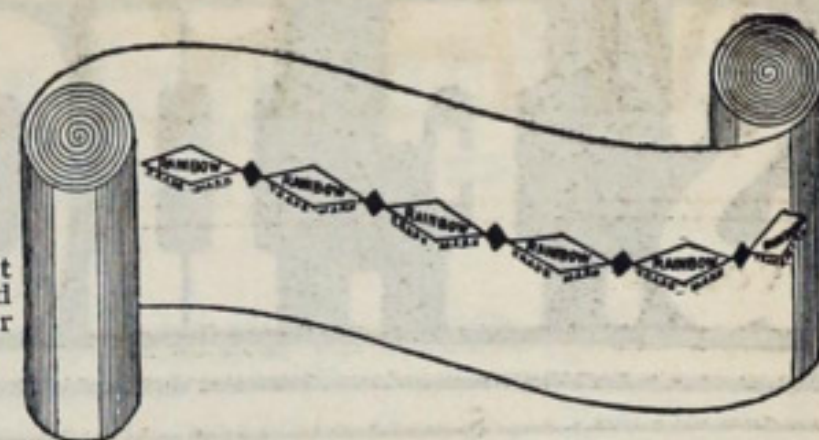
On board Steamship North Land, September 12, 1895.

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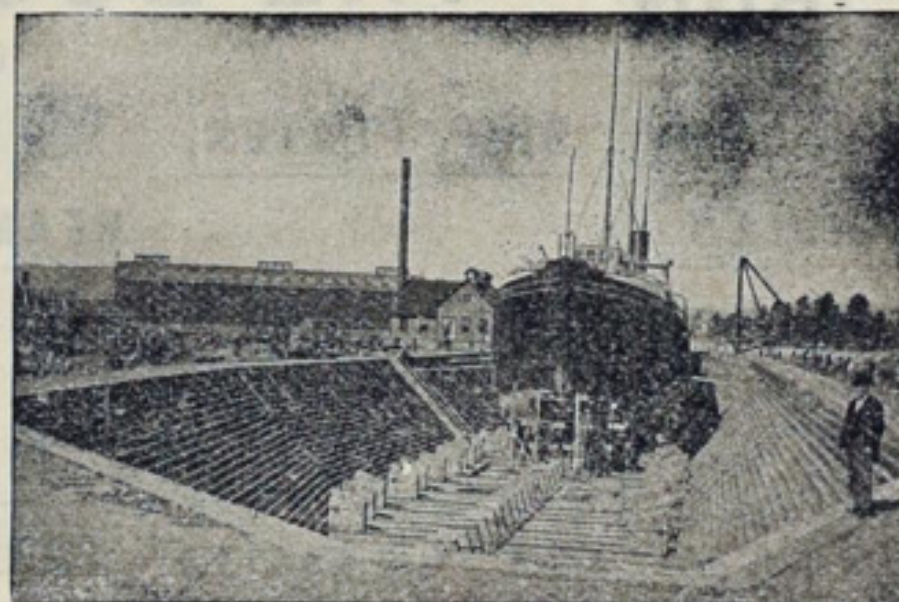
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Breadth, Top.....90 " 4 in.	Entrance, Bottom.....50 "
Breadth, Bottom.....52 "	Depth over Sills.....18 "

LARGEST DRY DOCK ON THE LAKES.

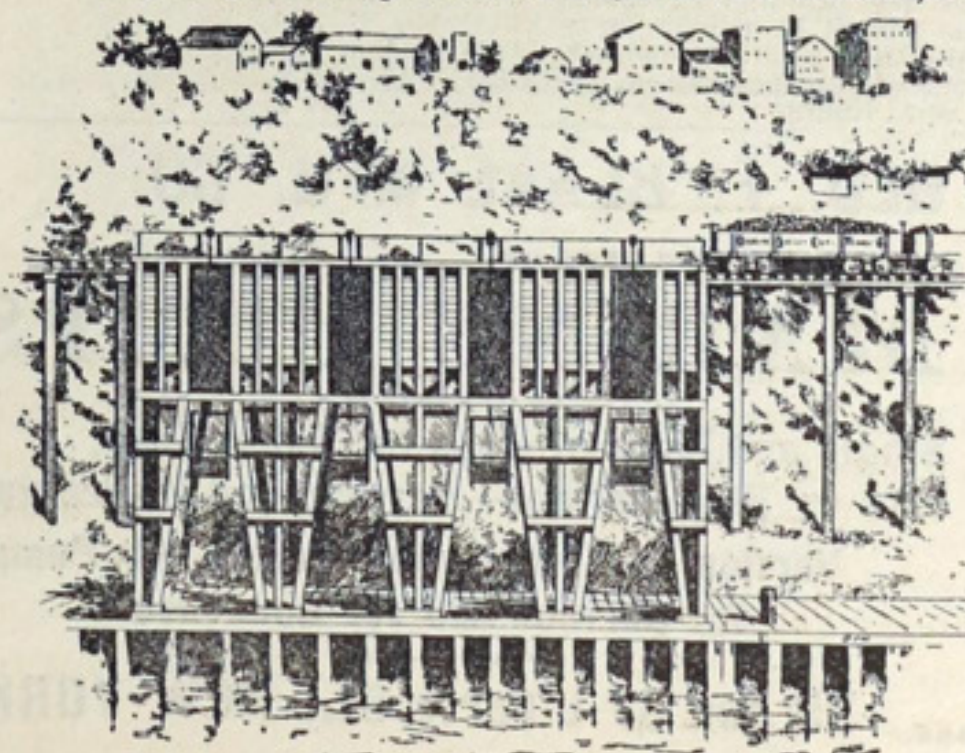
Prices for Repairs and Docking same as at lower lake ports
SUPERIOR, WIS.

A number of Propellor Wheels in stock at Dry Dock.

U. S. ENGINEER OFFICE, 1101 D. S. Morgan Building, Buffalo, N. Y., October 15, 1896. Sealed proposals for 12,500 feet of Breakwater extension, and for Sand-Catch Pier extension at Buffalo, N. Y., under continuous contract will be received here until 11 A. M. November 30, 1896, and then opened. Specifications and information furnished on application. T. W. SYMONS, Major Engrs. Nov. 25.

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Furnished
Day or Night.
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